DRAFT
NORTH SONOMA COUNTY AGRICULTURAL REUSE PROJECT ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT

March 2007

Prepared for:

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and

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State Clearinghouse No. 2006012130

DRAFT
Environmental Impact Report/Environmental Impact Statement

North Sonoma County Agricultural Reuse Project
being jointly pursued by the U.S. Department of Interior, Bureau of Reclamation,
and the Sonoma County Water Agency

The U.S Department of Interior, Bureau of Reclamation (Reclamation) and the Sonoma County Water Agency (SCWA) have prepared this joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS) on the proposed North Sonoma County Agricultural Reuse Project (NSCARP) to construct and operate a recycled water project. The SCWA is a special district created by California legislation in 1949 that supplies water to cities and public agencies throughout most of the populated areas of Sonoma County and northern Marin County and is the state lead agency, and Reclamation is the federal lead agency for this EIR/EIS, pursuant to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), respectively.

NSCARP objectives are to provide a reliable, long-term water supply for agricultural interests; reduce discharges from local wastewater treatment plants to local waterways; reduce the use of groundwater and surface water for agricultural purposes in north Sonoma County; provide an environmentally responsible, long-term method of recycled water use; and, increase reliability and long-term sustainability of the regional water supply.

NSCARP would result in fewer agricultural diversions from the Russian River and its tributaries, which would enable the SCWA to release less water from storage in Lake Mendocino and Sonoma to meet water demands and instream flow requirements. This would result in more water being conserved in storage in these reservoirs, which would provide more operational flexibility for the SCWA to benefit fisheries sources in the Russian River. The increased operational flexibility would not result in additional water being available for other uses because existing reservoir storage capacity, water rights, and flow requirements would not change.

In addition to the No Action alternative, three primary alternatives are under consideration. Alternative 2 represents a recycled water supply project for the entire NSCARP area. It would involve the design and construction of 19 recycled water storage reservoirs totaling about 11,200 acre-feet (af) in storage capacity. In addition, Alternative 2 would involve the design and construction of approximately 112 miles of transmission pipeline, and numerous booster and distribution pump stations for conveying water from the Geysers Pipeline to the storage reservoirs, and for distribution of the storage recycled water from the reservoirs to the agricultural lands. Alternative 3 represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C reservoirs. Alternative 4 represents a scaled-down version of the Russian River Valley subarea. It limits storage reservoir development to the Russel-Bucher, Bucher, and Becnel #2 reservoir sites and utilizes the existing Gallo Twin Valley Reservoir.

The EIR/EIS describes the environmental effects of constructing and operating NSCARP The EIR/EIS also fulfills the requirements of Executive Order 11988 (Floodplain Management), 11990 (Protection of Wetlands), and 12898 (Environmental Justice).

For further information on this EIR/EIS, contact Mr. David Cuneo, Senior Environmental Specialist, SCWA, 404 Aviation Boulevard, Santa Rosa, California, telephone (707) 547-1935.

Comments on the EIR/EIS must be provided by May 18, 2007.

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Executive Summary

Executive Summary

The Sonoma County Water Agency (SCWA) is a special district created by California legislation in 1949. It supplies water to cities and public agencies throughout most of the populated areas of Sonoma County and northern Marin County, and is responsible for regulating the flow of the Russian River with releases of water from Lake Mendocino and Lake Sonoma. SCWA also provides wastewater management services to areas within Sonoma County, is responsible for flood control projects in cooperation with federal, state and local agencies, and operates a hydroelectric facility to generate electrical energy. The mission of SCWA is to effectively manage the water resources in its care for the benefit of people and the environment through resource and environmental stewardship, technical innovation, and responsible fiscal management. SCWA is serving as the lead agency under the California Environmental Quality Act (CEQA) for this joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

The U.S. Department of Interior, Bureau of Reclamation (Reclamation) provided grant funding for preparation of a feasibility study for the North Sonoma County Agricultural Reuse Project (NSCARP) pursuant to Title XVI of Public Law 102-575, as amended. There is the potential that Congress would authorize and appropriate partial funding for the design and construction of NSCARP under PL102-575, Title XVI. Based on this authorization and appropriation, Reclamation could provide up to 25 percent of project construction cost to a maximum Federal cost share contribution of $20 million (October 1996 prices). Due to the potential for Federal funding, Reclamation is lead Federal agency under NEPA.

Because of the complex nature of the NSCARP, Reclamation and SCWA have determined that preparation of a federal EIS is the most appropriate form of NEPA compliance. Other federal agencies, such as the U.S. Army Corps of Engineers (Corps), U.S. Fish and Wildlife Service (Service), and National Oceanic Atmospheric Administration (NOAA Fisheries), may rely on the EIR/EIS to satisfy NEPA for their individual approvals of project components.

ES-1. PROJECT PURPOSE/OBJECTIVES AND NEED

NSCARP is intended to contribute to meeting the objectives of SCWA and Reclamation. The primary needs, purposes, and objectives of the project are as follows:

Need

- Federal and state regulatory agencies have expressed concern regarding potential impacts to fisheries resources and habitat within the Russian River and its tributaries. Currently, agricultural lands in the NSCARP area are irrigated with water originating from the Russian River, its tributaries, and groundwater. There is a need to allow water to remain in the Russian River system and its tributaries to improve habitat for listed fish species. There also is a need for adequate infrastructure to store and distribute recycled water produced by various entities for reuse throughout the region.

Purposes/Objectives

- Provide a reliable, long-term water supply for agricultural interests;
- Reduce discharges from local wastewater treatment plants to local waterways;
- Reduce the use of groundwater and surface water for agricultural purposes in north Sonoma County;
- Provide an environmentally responsible, long-term method of recycled water use; and,
- Increase reliability and long-term sustainability of the regional water supply.

ES-2. BACKGROUND

Federal and state regulatory agencies have expressed concerns regarding the potential impacts to fisheries resources and habitat within the Russian River and its tributaries. These concerns have and will continue to result in increased scrutiny of future diversion of water for all uses. In 1996, NOAA Fisheries listed the coho salmon as threatened in the Russian River watershed and adjacent watersheds pursuant to the Federal Endangered Species Act (FESA). Chinook salmon and steelhead were similarly listed in 1997 and 1999, respectively. Through the proposed distribution, storage, and use of recycled water for agricultural purposes, the SCWA has identified a strategy to reduce reliance on diversions from the Russian River and other natural waterways.

The use of recycled water for irrigation for agricultural purposes has been occurring in California since 1890 (California Recycled Water Task Force, 2003). By the year 2000, there were 234 wastewater treatment plants providing recycled water for agricultural and landscape purposes in California (California Recycled Water Task Force, 2003) Today, recycled water in California is being used for a variety of purposes, such as irrigation for row crops, vineyard, pasture, stock feed, nursery products, turf in parks and schoolyards, and landscaping. In northern Sonoma County, about 8,638 acres of agricultural land are irrigated with recycled water provided by the City of Santa Rosa's Laguna Wastewater Treatment Facility (WWTF), the Town of Windsor's WWTF, and the Airport-Larkfield-Wikiup WWTF.

As stated herein, the SCWA regulates the flow of the Russian River for the benefit of agricultural, municipal, and instream beneficial uses. The use of recycled water and conjunctive use of surface and groundwater supplies within the SCWA service area are all important factors in evaluating the management of the regional water supply. SCWA believes the use of recycled water to offset surface and groundwater sources used by agricultural entities in the Russian River, Alexander, and Dry Creek valleys would benefit fisheries in the Russian River watershed. The recycled water would be used for agricultural purposes consistent with the California Code of Regulations, Title 22 pertaining to the use of tertiary-treated recycled water.

NSCARP would result in fewer agricultural diversions from the Russian River and its tributaries, which would enable the SCWA to release less water from storage in Lake Mendocino and Sonoma to meet water demands and instream flow requirements. This would result in more water being conserved in storage in these reservoirs, which would provide more operational flexibility for the SCWA to benefit fisheries sources in the Russian River. The increased operational flexibility would not result in additional water being available for other uses because existing reservoir storage capacity, water rights, and flow requirements would not change.

ES-3. PUBLIC AND AGENCY INVOLVEMENT

During the project development process, a series of meetings was held to solicit community input concerning the project. In 1997, SCWA conducted a Recycled Water Workshop to evaluate the feasibility of a Sonoma County Recycled Water Distribution System. Conceptual layouts of pipeline routes and storage reservoir sites were presented as well as the benefits of expanded use of recycled water in Sonoma County. The workshop identified several north Sonoma County areas, including the Alexander Valley, Russian River Valley, and Dry Creek Valley as potential recipients of recycled water for agricultural use.

The SCWA held three informational pre-scoping meetings for early public input and outreach outside the official CEQA/NEPA process. The meetings were held: (1) February 3, 2004 at Alexander Community Hall; (2) February 4, 2004 at Warm Springs Dam Visitor Center; and, (3) February 5, 2004 at Westside School.

A Notice of Preparation (NOP) was filed with the State Clearinghouse (SCH# 2006012130) on January 27, 2006 for NSCARP pursuant to the California Environmental Quality Act (CEQA). See Appendix A. In addition, the NOP was filed with the Sonoma County Clerk's Office, and sent to federal, state, and local agencies, and interested persons.

Reclamation filed a Notice of Intent (NOI) with the Federal Register on January 31, 2006 (see Appendix A) pursuant to NEPA requirements. Reclamation also published a notice of the Scoping Meeting on January 31, 2006 (see Appendix A)

SCWA held a CEQA Scoping Meeting at the Alexander Valley Community Hall on Thursday, February 16, 2006. The meeting was held to provide an overview of the proposed project and solicit input from interested individuals concerning the scope of the environmental analyses as outlined in the project NOP. The Scoping Meeting used an Open House format where SCWA staff were available to answer questions and provide information about NSCARP. Thirty-nine members of the public signed the sign-in sheet (see Appendix B). Following the open house, SCWA staff gave an overview presentation and summarized the environmental review process, including a discussion of the EIR/EIS being prepared for NSCARP, and the distribution of the NOP and NOI. Included in Appendix B is a copy of the transcripts for the two presentations, as well as questions and comments from the public.

The NOP review period concluded on March 15, 2006 (See Appendix C).

ES-4. APPROACH TO ALTERNATIVES DEVELOPMENT

CEQA and NEPA require that EIRs and EISs describe and evaluate reasonable alternatives to a proposed action, and both must describe an alternative that assumes that the proposed action and alternatives would not be implemented. To comply with these regulations, SCWA evaluated a range of alternatives to identify the most promising alternatives for detailed study.

ES-5. ALTERNATIVES CONSIDERED IN DETAIL IN THE EIR/EIS

SCWA and Reclamation have formulated the alternatives evaluated in this EIR/EIS. Cost and engineering factors, water quality objectives, institutional considerations, and many environmental factors have had substantial influence in shaping the alternatives summarized below.

Alternative 1: No Action

The "No Action" Alternative means that a regional water conveyance and storage project to serve recycled water to the four subareas would not be implemented. Individual recycled water providers identified herein may serve recycled water to some portions of the lands within the four subareas, but there would be no overall regional project. The "No Action" Alternative means that the recycled water providers would have to identify individual projects where recycled water could be used for agricultural purposes.

Alternative 2: Entire North Sonoma Agricultural Reuse Project

Alternative 2 represents a recycled water supply project for the entire NSCARP area. Approximately 21,500 acres of presently developed agricultural lands (vineyards, dairies, and orchards) within the Russian River, Alexander and Dry Creek valleys would be served by recycled water. The water supply for NSCARP would be tertiary-treated wastewater generated by the City of Santa Rosa (City), Town of Windsor (Town), and Airport/Larkfield/Wikiup Sanitation Zone (ALWSZ) facilities, and conveyed to the project primarily through the City's Geysers Pipeline. It would involve the design and construction of 19 recycled water storage reservoirs totaling about 11,200 acre-feet (af) in storage capacity. In addition, NSCARP would involve the design and construction of approximately 112 miles of transmission pipeline, and numerous booster and distribution pump stations for conveying water from the Geysers Pipeline to the storage reservoirs, and for distribution of the storage recycled water from the reservoirs to the agricultural lands.

Alternative 3: Alexander Valley - Jordan Reservoir Subset

This alternative represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C reservoirs. This alternative would serve a smaller service area commensurate with the amount of potential storage capacity at the two proposed reservoir sites and potential summer recycled water supplies available from the ALWSZ treatment plant.

Alternative 4: Russian River Valley-Westside Subset

This alternative represents a scaled-down version of the Russian River Valley subarea. It limits storage reservoir development to the Russel-Bucher, Bucher, and Becnel #2 reservoir sites and utilizes the existing Gallo Twin Valley Reservoir. This alternative involves serving a smaller service area than the Russian River Valley subarea commensurate with the potential storage capacity that has been identified in the hills west of Westside Road, and potential summer recycled water supplies available from the ALWSZ. This scaled-down project is referred to as the Russian River Valley-Westside subset.

Preferred Alternative

SCWA and Reclamation have identified Alternative 2 as the preferred alternative. The selection was made based on Alternative 2's ability to fully meet the project purpose and objectives, engineering feasibility, minimization of environmental impacts, and input received during the public scoping process. Additionally, the selection of Alternative 2 as the preferred alternative is based on the conclusions of the impact analysis presented in Chapter 3.

Environmentally Superior Alternative

Alternative 2 is environmentally superior. There are many similarities between the environmental impacts associated with Alternatives 2 through 4. Alternatives 3 and 4 would have less construction impacts than Alternative 2 because of the reduced project area and the fewer number of proposed facilities. However, Alternative 2 is preferred because it provides the greatest potential for meeting the project's purposes and objectives to improve habitat for listed fish species.

With Alternative 2, there would be the greatest offset of surface water use; therefore, the largest increase in summer flows in the tributaries of the Russian River. In addition, because the reduction in agricultural diversions from the Russian River would help maintain storage levels in Lake Mendocino, Alternative 2 would result in the most water being available that can be released in the fall to assist with Chinook salmon upstream migration.

Although the No Action Alternative would cause fewer direct environmental impacts, it would not meet the purpose and need or objectives of the proposed project.

ES-6. SUMMARY OF ENVIRONMENTAL IMPACTS AND AVAILABLE MITIGATION MEASURES

Table ES-1 summarizes the impacts of the NSCARP alternatives. The table is organized to present the impacts by environmental issue area and to indicate the significance of each impact, available mitigation measures, and the significance of each impact if mitigation is implemented.

SCWA and Reclamation have incorporated certain mitigation measures into the project description as environmental commitments. These commitments include preparation and implementation of the following:

- General Construction Measures
- Frac-Out Contingency Plan
- Erosion and Sediment Control Plan
- Storm Water Pollution Prevention Plan
- Traffic Control Plan
- Dust Suppression Plan
- Fire Control Plan
- Phase I and Phase II Hazardous Materials Studies

- Hazardous Materials Management Plan
- Agricultural Land Restoration
- Spoils Disposal Plan
- Environmental Training
- Access Point/Staging Area Plan
- Trench Safety Plan
- Private Property Acquisition and Access
- Noise Compliance
- Project Planning, Coordination, and Communication Plan
- Project Maintenance Program
- Revegetation/Site Restoration Plan

Table ES-1. Summary of Impacts and Mitigation Measures

Impact		Impact Category	Applicable Alternative	Mitigation Measures
3.1 Aesthetics				
AES-1	NSCARP potentially could have a substantial adverse effect on the visual character and scenic resources on the project area based on evaluation criteria 1 and 2.	Significant but Mitigable	2, 3, 4	• The SCWA shall minimize construction zones/staging areas to the extent feasible; • Following construction activities, the SCWA shall restore disturbed areas by reestablishing exiting topography, including repaving roadways, replanting trees, and/or reseeding with a native seed mix typical of the immediate surrounding areas; • The SCWA shall revegetate the berms around the reservoirs with native seed mixes to soften the visual effect of the reservoirs from adjacent roadways; and, • SCWA shall use design elements to enhance visual integration of the booster and distribution pump stations with their surroundings. These proposed facilities shall be painted low-glare earth-tone colors that blend with their surrounding terrain; highly reflective building materials and/or finishes shall not be used in the designs for proposed facilities. Pumping stations shall be screened with vegetation as much as feasible. Where applicable, pump-station placement shall adhere to the 20-foot County setback requirement for those stations located along designated Scenic Corridors.
AES-2	NSCARP would introduce new sources of light to the project area.	Significant but Mitigable	2, 3, 4	A. Light sources that are utilized during nighttime construction activities shall be shielded and directional so as to minimize light-spill. Thus, significant impacts from nighttime light and glare would be avoided; and, B. The exterior lighting installed around the storage reservoirs and distribution and booster pump stations shall be a minimum standard required to ensure safe visibility. Lighting also shall be shielded and directed downward to minimize impacts of light and glare.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
3.2 Agricultural Resources				
AG-1	The NSCARP could result in loss of Farmland.	Significant and Unavoidable	2, 3, 4	The SCWA shall site project components to avoid status Farmland and lands subject to Williamson Act Contracts, to the extent feasible. If project components cannot feasibly be located outside of lands designated as status Farmland or lands subject to Williamson Act Contracts, landowners would be compensated for the fair market value of lands acquired and for any applicable Williamson Act contract cancellation fees. Table 3.2-5 shows lands within the project area that are under Williamson Act Contracts and would require modifications to existing lands (i.e., development or expansion of reservoirs, placement of underground pipeline, or pump station development). No additional mitigation has been identified that would serve to reduce the loss of status Farmland to a less than significant level and, therefore, the NSCARP would result in a significant and unavoidable impact associated with the permanent loss of status Farmland and lands subject to Williamson Act Contracts.
AG-2	The NSCARP would have the potential to conflict with existing Williamson Act Contracts.	Significant and Unavoidable	2, 3, 4	Implement Mitigation Measure AG-1.
AG-3	The NSCARP would have the potential to reduce soil productivity resulting from topsoil erosion due to application of recycled water.	Less than Significant	2, 3, 4	None required
AG-4	The NSCARP would have the potential to reduce soil productivity due to build-up of trace elements or salinity.	Less than Significant	2, 3, 4	None required
AG-5	The NSCARP would have the potential to introduce glassy-winged sharpshooters (Homalodisca coagulate) to the project area.	Significant but Mitigable	2, 3, 4	Plants acquired for landscaping and revegetation purposes shall be purchased from locally grown stock or from a nursery that has an approved monitoring program for the GWSS.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
3.3	**Air Quality (AQ-1 – AQ6: Construction; AQ-7 – AQ-12: Operation)**			
AQ-1	Emissions of criteria pollutants based on mass emissions thresholds established by the BAAQMD and NSCAPCD.	Significant but Mitigable	2, 3, 4	A. The following measures have been incorporated into the project design to reduce construction related air quality impacts from fugitive dust emissions resulting from construction of Alternatives 2, 3, and 4 to a less than significant level: • Water all active construction areas at least twice daily; • All trucks transporting soil, sand, or other loose materials will be covered or will maintain at least two feet of freeboard; • Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites; • Sweep daily all paved access roads, parking areas, and staging areas at construction sites; • Sweep streets daily if visible soil material is carried on adjacent public streets; • Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more); • Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed sediment stockpiles; • Limit traffic speeds on unpaved roads to 15 mph; • Install sandbags or other erosion control measures to prevent silt runoff to public roadways; • Replant vegetation in disturbed areas as quickly as possible. • Install wheel washers for all existing trucks, or wash off the tires or tracks of all trucks and equipment leaving the site; and, • Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				B. The SCWA shall apply the following mitigation measures to help reduce emissions from construction equipment exhaust (e.g. NOx, ROG, CO): • Use alternatively fueled construction equipment where feasible; • Minimize idling time (e.g. 5-minute maximum); • Maintain properly tuned equipment; and, • Limit the house of operations of heavy duty equipment and/or the amount of equipment in use, to the extent feasible.
AQ-2	Conflicts with Clean Air Plan.	Less than Significant	2, 3, 4	None required.
AQ-3	Violates ambient air quality standards.	Less than Significant	2, 3, 4	None required.
AQ-4	Cumulatively considerable net increase of any criteria pollutant for which the region is considered non-attainment.	Less than Significant	2, 3, 4	None required.
AQ-5	Expose sensitive receptors to toxic air contaminant pollutant concentrations.	Less than Significant	2, 3, 4	None required.
AQ-6	Create objectionable odors affecting a substantial number of people.	Less than Significant	2, 3, 4	None required.
AQ-7	Emissions of criteria pollutants based on mass emissions thresholds established by the BAAQMD and NSCAPCD.	Less than Significant	2, 3, 4	None required.
AQ-8	Conflicts with Clean Air Plan.	Less than Significant	2, 3, 4	None required.
AQ-9	Violation of ambient air quality standards.	Less than Significant	2, 3, 4	None required.
AQ-10	Cumulatively considerable net increase of any criteria pollutant for which the region is considered non-attainment.	Less than Significant	2, 3, 4	None required.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
AQ-11	Expose sensitive receptors to toxic air contaminant pollutant concentrations.	Less than Significant	2, 3, 4	None required.
AQ-12	Create objectionable odors affecting a substantial number of people.	Less than Significant	2, 3, 4	None required.
3.4	**Biological Resources**			
BIO-1	Construction of the NSCARP Alternatives would result in the temporary disturbance to vegetation and wildlife.	Less than Significant	2, 3, 4	None required. However, following construction, SCWA shall revegetate all disturbed areas with an appropriate mix of grasses and other herbaceous plant species. This will provide replacement vegetative cover and will promote the reoccupation or periodic use of these areas for nesting, cover, and foraging for wildlife. All installed vegetation will be certified free of noxious weeds.
BIO-2	Construction of the NSCARP Alternatives would result in the permanent loss of native upland woodland (non-riparian) habitat.	Significant but Mitigable	2, 3, 4	To minimize impacts to native trees as a result of project construction, the following measures will be implemented by the SCWA and its contractors: A. To the extent feasible, the SCWA shall, prior to final design, adjust alignment of pipelines, pump plants, and reservoirs to avoid and minimize the removal of native oak trees. Within proposed pipeline corridors, the construction zone is approximately 100 feet wide to accommodate alignment adjustments. Trees that are not within the construction zone, or for which removal is not necessary due to safety issues, shall be avoided; B. Prior to project construction, SCWA shall conduct a survey to identify trees within the construction area that will be removed for pipeline installation. All native trees greater than six inches in diameter at breast height (dbh), as measured 4.5 feet above grade, will be tallied, tagged, measured, and health and vigor evaluated. Mitigation will not be required for non-native trees, nor native trees less than six inches at dbh;

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				C. All native trees to remain in place and located within 25 feet of ground disturbances shall be temporarily fenced by SCWA with orange plastic construction (exclusion) fencing prior to and throughout all construction activities. The exclusion fencing shall be installed six feet outside the canopy dripline of each protected tree or stand. The fencing is intended to prevent equipment operations in the proximity of protected trees that may compact soil, crush roots, or collide with the tree trunk and/or overhanging branches; D. No construction equipment shall be parked, stored, or operated within six feet of the dripline of any protected tree; E. SCWA or its contractor shall prepare, prior to construction, and subsequently implement following construction, a Restoration and Revegetation Plan for the project. The Plan will detail site preparation, planting techniques, watering schedules, maintenance procedures, and success criteria for installed plantings. The Plan shall include a monitoring program and will require weekly inspection of the plantings for the first month, followed by monthly monitoring for the next three months; and then quarterly monitoring for the next 12 months unless success criteria are met earlier. After the first year, plantings will be monitored on an annual basis for a period of four years. Monitoring will continue until performance standards are met; At locations where on-site mitigation may be precluded due to restricted rights-of-way and other factors, some of the mitigation may be conducted off-site at a publicly owned park or facility, or as part of a regional habitat restoration/enhancement program.
BIO-3	Construction of the NSCARP alternatives will result in the loss of protected oak trees	Significant but Mitigable	2, 3, 4	To minimize impacts to native oaks trees as a result of project construction, the following measures will be implemented by the SCWA and its contractors: A. Implement Mitigation Measure BIO-2 ; and,

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				B. Following construction, SCWA shall replace each valley oak tree removed and/or substantially damaged as a result of project construction in accordance with Section 26-67-0303 of the Sonoma County Zoning Code.
BIO-4	Construction of the NSCARP alternatives could impact protected raptors and other bird species during nesting.	Significant but Mitigable	2, 3, 4	SCWA shall schedule tree removal and ground-clearing activities prior to the initiation of nesting activity (March) or after fledging (August). If this is infeasible, SCWA shall conduct pre-construction surveys between February 15 and August 15 in potential nesting habitat to identify nest sites. If an active raptor nest is observed within 350 feet of the project site, SCWA shall contact CDFG and establish an appropriate protective buffer around the nest tree and prohibit construction activities in the buffer zone until the young have fledged.
BIO-5	Construction of the NSCARP alternatives would result in the loss or degradation of wetlands and other waters.	Significant but Mitigable	2, 3, 4	SCWA shall implement the following measures to avoid, minimize, reduce and/or compensate for impacts to waters and wetlands: A. For pipeline crossings of channels, wetlands, and other regulatory waters, the SCWA shall use trenchless construction methods (e.g. jack-and-bore, horizontal direction drilling [HDD], or suspension on an existing bridge; B. Silty or turbid water produced from pipeline construction activities shall not be discharged directly into streams. Instead, any water impounded between the dams and/or underflow seepage into the work site will be pumped into an upland containment area where the water will be allowed to percolate into the soil and not mix with channel flows; C. SCWA shall secure applicable permits from CDFG, the Corps, and RWQCB before initiating construction in area requiring permits from these agencies;

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				D. A compensatory mitigation ratio (replacement-to-loss) for the temporary and permanent impacts shall be a minimum of 1:1 to assure no net loss. Potential mitigation strategies include: 1) the purchase of mitigation credits at an approved Wetland Mitigation Bank; 2) contribution of in-lieu fees for a regionally approved riparian and/or wetland creation or restoration project; and, 3) development of compensatory mitigation wetlands and riparian areas at project sites. Compensatory mitigation shall be subject to the approval of the Corps, CDFG, and RWQCB, and consistent with standards pertaining to mitigation type, location, and replacement-to-loss ratios. E. Diversion channels shall be constructed prior to the placement of fill material into natural channels for reservoir construction to prevent unexpected flows from entering the reservoir; and, F. The diversion channels shall be constructed in upland areas and in a manner to allow the establishment of vegetation similar to that of the natural channel being replaced. This will partially offset a portion of the loss of natural channel vegetation from reservoir construction, and provide a site for compensatory mitigation.
BIO-6	Construction of the NSCARP alternatives could impact special-status species and/or adversely effect designated critical habitat.	Significant but Mitigable	2, 3, 4	SCWA shall implement the following impact minimization and avoidance measures to reduce or compensate for impacts to special-status species: A. Prior to construction, there will be consultation with USFWS, NOAA Fisheries, and CDFG under FESA and CESA to secure proper authorization in the event of an “ incidental take” of a listed species is anticipated; B. A minimum of one year prior to construction activities, field surveys will be conducted at each project site to determine the presence of special-status species and/or suitable habitat. All surveys will be conducted in accordance with approved survey protocols;

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				C. If surveys identify the presence of special-status species at a project site, the following will be implemented: a. If feasible, the construction area will be adjusted to avoid impacts to special-status species and habitat. The adjusted alignment will be within the project area, and will include appropriate buffers between the species' occurrence or habitat and the construction area; b. If adjustment of the construction area is not feasible, there will be consultation with USFWS, NOAA Fisheries, and CDFG to develop species-specific measures to minimize the effects of construction and operation of the NSCARP project. This may include: seasonal construction restrictions, such as during the active nesting or rearing season of protected birds and bats, respectively; erection of protective barriers; collection and relocation of individuals; site monitoring during construction; site restoration; and, implementation of construction practices that would avoid specific areas, such as horizontal directional drilling, suspension of pipelines on existing bridges, etc. c. If there is no feasible alternative to the disturbance to special-status species or habitat, SCWA will compensate for any loss of special-status species habitat through a combination of the following: • creation of replacement habitat • habitat preservation through Conservation Easement • acquisition of credits at an approved mitigation bank • in-lieu contribution to a regional habitat restoration fund, and/or • other compensatory measures that are deemed acceptable by the USFWS, NOAA Fisheries, and CDFG. D. Any project component that would jeopardize the continued existence of a listed species will be eliminated from consideration. The SCWA will prepare and implement Frac-out Plan as detailed in Section 2.4 in the event horizontal directional drilling is proposed for any river crossing.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
BIO-7	Construction of the recycled water reservoirs can increase ecological risk to animals and plants exposed to organic and inorganic compounds potentially occurring in treated wastewater (e.g., chronic toxicity and bioaccumulation).	Less than Significant	2, 3, 4	None required
BIO-8	Construction of the recycled water reservoirs can potentially increase ecological risk to animal and plant populations exposed to endocrine disrupting compounds.	N/A	2, 3, 4	Because of the evolving research on the issue of EDCs and xenobiotics, SCWA will perform the following: • Monitor on-going research to stay abreast of the state-of-the-science concerning EDCs and xenobiotics; • Consult and coordinate with the Regional Water Quality Control Board, USEPA, and other regulatory agencies on developing standards and promulgating regulations; • Implement appropriate treatment technologies as required by regulatory agencies; and, • Formulate and implement adaptive management procedures to respond to changes in regulations. • Encourage public awareness of recent federal guidelines concerning the proper disposal of prescription drugs, such as take-back programs, disposing down toilet or sink only if so labeled, etc. (Office of National Drug Control Policy, 2007).
BIO-9	The NSCARP alternatives could potentially block or disturb major migration corridors between resource areas for native animals.	Significant but Mitigable	2, 3, 4	See Mitigation Measure BIO-5F.
BIO-10	The NSCARP alternatives could potentially cause a decrease in stream flows, affecting aquatic habitat and its inhabitants downstream from a dam.	Less than Significant	2, 3, 4	None required

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
3.5	**Cultural Resources**			
CUL-1	Implementation of Alternative 2 of the NSCARP could result in the potential disturbance of known prehistoric and historic sites.	Significant but Mitigable	3	A. Where feasible, the SCWA shall avoid prehistoric and historic sites. If the SCWA cannot avoid the site and impacts may occur, then SCWA shall implement Mitigation Measures CUL-1(B); B. Update the records for prehistoric sites CA-Son-622 and CA-Son-1929, including determining the boundaries of the sites. If site boundaries are found to extend into the project APE, the eligibility The sites for inclusion in the NRHP and the CRHR shall be determined by an archaeologist meeting the Secretary of Interior's Professional Qualifications Standards in prehistoric archaeology. If a site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery shall be implemented for the area of the site within the project APE. The eligibility of historic sites CA-2317H, P-49-2283, the J Wine Trash Dump, and bridges, 20C-0006, 20C-0106, and 20-0038 for inclusion in the NRHP and the CRHR shall be determined by an archaeologist and/or historian meeting the Secretary of Interior's Professional Qualifications Standards in historical archaeology and/or architectural history. If a site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery and/or other appropriate documentation (e.g., Historic American Building Survey reports and/or photographs) shall be implemented for a site or the area of a site within the project APE. In addition, project plans shall include design features, as feasible, for pipeline installation on any bridges that are determined eligible for inclusion in the NRHP or CRHR. Bridge 20C-0155, Wohler Bridge, is eligible for inclusion in the NRHP and the CRHR. If project plans require that pipeline be attached to the bridge, an architectural historian that meets the Secretary of Interior's Professional Qualifications Standards in architectural history shall prepare appropriate documentation (e.g., Historic American Building Survey reports and/or photographs) for the bridge. In addition, project plans shall include designs features, as feasible, for pipeline installation on the bridge.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
CUL-2	Implementation of Alternative 2 of the NSCARP could result in the potential disturbance of undiscovered prehistoric sites, historical sites, and isolated prehistoric and/or historic features or artifacts, and human remains.	Significant but Mitigable	2	A. Project contractors and their staff shall be informed of the potential to encounter cultural resources during project implementation and protocols to follow if cultural resources are uncovered. This information may be presented to contractors and their staff through the use of “tail-gate” meetings or other mechanisms (e.g., handouts). Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during installation of pipelines and construction of reservoirs, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with an appropriate specialist (e.g., archaeologist or architectural historian). SCWA shall consider mitigation recommendations presented by a qualified archeologist for any unanticipated discoveries. SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. B. Project contractors and their staff shall be informed of the potential to encounter human remains during project implementation and protocols to follow if human remains are uncovered. This information may be presented to contractors and their staff through the use of “tail-gate” meetings or other mechanism (e.g., handouts). If human remains are discovered, all work shall be suspended in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California’s Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
CUL-3	Implementation of Alternative 2 of the NSCARP could result in the potential disturbance or destruction of undiscovered paleontological resources.	Significant but Mitigable	2	Project contractors and their staff shall be informed of the potential to encounter paleontological resources during project implementation and protocols to follow if paleontological resources are uncovered. This information may be presented to contractors and their staff through the use of “tail-gate” meetings or other mechanism (e.g., handouts). Should any potentially unique paleontological resources (fossils) be encountered during project activities, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, the SCWA will coordinate any necessary investigation of the discovery with a qualified paleontologist. SCWA shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. The SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.
CUL-4	Implementation of Alternative 3 of the NSCARP could result in the potential disturbance of known historic sites.	Significant but Mitigable	3	The eligibility of historic site CA-2317H and the Jimtown Bridge, 20C-0006 for inclusion in the NRHP and the CRHR shall be determined by an archaeologist and/or historian meeting the Secretary of Interior’s Professional Qualifications Standards in historical archaeology and/or architectural history. If a site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery and/or other appropriate documentation (e.g., Historic American Building Survey reports and/or photographs) shall be implemented for a site or the area of a site within the project APE. In addition, project plans shall include design features, as feasible, for pipeline installation on any bridges that are determined eligible for inclusion in the NRHP or CRHR.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
CUL-5	Implementation of Alternative 3 of the NSCARP could result in the potential disturbance of undiscovered prehistoric sites, historical sites, and isolated prehistoric and/or historic features or artifacts, and human remains.	Significant but Mitigable	3	A. Project contractors and their staff shall be informed of the potential to encounter cultural resources during project implementation and protocols to follow if cultural resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanisms (e.g., handouts). Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during installation of pipelines and construction of reservoirs, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, the SCWA will coordinate any necessary investigation of the discovery with an appropriate specialist (e.g., archaeologist or architectural historian). SCWA shall implement any mitigation necessary for the protection of cultural resources. SCWA shall consider mitigation recommendations presented by a qualified archeologist for any unanticipated discoveries. SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. B. Project contractors and their staff shall be informed of the potential to encounter human remains during project implementation and protocols to follow if human remains are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). If human remains are discovered, all work shall be suspended in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
CUL-6	Implementation of Alternative 3 of the NSCARP could result in the potential disturbance or destruction of undiscovered paleontological resources.	Significant but Mitigable	3	Project contractors and their staff shall be informed of the potential to encounter paleontological resources during project implementation and protocols to follow if paleontological resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). Should any potentially unique paleontological resources (fossils) be encountered during project activities, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with a qualified paleontologist. SCWA shall implement any mitigation necessary for the protection of paleontological resources. SCWA shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.
CUL-7	Implementation of Alternative 4 of the NSCARP could result in the potential disturbance of a known prehistoric site.	Significant but Mitigable	4	Update the record for prehistoric site CA-Son-1929, including determining the boundaries of the sites. If site boundaries are found to extend into the project APE the eligibility of the sites for inclusion in the NRHP and the CRHR shall be determined by an archaeologist meeting the Secretary of Interior's Professional Qualifications Standards in prehistoric archaeology. If the site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery shall be implemented for the area of the site within the project APE.
CUL-8	Implementation of Alternative 4 of the NSCARP could result in the potential disturbance of undiscovered prehistoric sites, historical sites, and isolated prehistoric and/or historic features or artifacts, and human remains	Significant but Mitigable	4	A. Project contractors and their staff shall be informed of the potential to encounter cultural resources during project implementation and protocols to follow if cultural resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanisms (e.g. handouts)

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during installation of pipelines and construction of reservoirs, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with an appropriate specialist (e.g., archaeologist or architectural historian). SCWA shall implement any mitigation necessary for the protection of cultural resources. SCWA shall consider mitigation recommendations presented by a qualified archeologist for any unanticipated discoveries. The County shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. B. Project contractors and their staff shall be informed of the potential to encounter human remains during project implementation and protocols to follow if human remains are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). If human remains are discovered, all work shall be suspended in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
CUL-9	Implementation of Alternative 4 of the NSCARP could result in the potential disturbance or destruction of undiscovered paleontological resources.	Significant but Mitigable	4	Project contractors and their staff shall be informed of the potential to encounter paleontological resources during the project implementation and protocols to follow if paleontological resources are uncovered. This information may be presented to contractors and their staff through the use of “tail-gate” meetings or other mechanism (e.g., handouts). Should any potentially unique paleontological resources (fossils) be encountered during project activities, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with a qualified paleontologist. SCWA shall implement any mitigation necessary for the protection of paleontological resources. SCWA shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. The County shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.
3.6	**Environmental Justice**			
ENV-1	The NSCARP could result in significant adverse environmental impacts on a minority and/or low-income community.	Less than Significant	2, 3, 4	None required
ENV-2	NSCARP could result in disproportional significant adverse human health or environmental effects on a minority and/or low-income community.	Less than Significant	2, 3, 4	None required
3.7	**Geology, Soils and Seismicity**			
GEO-1	The NSCARP project potentially could be located within an area of unstable slope conditions.	Significant but Mitigable	2, 3, 4	The following recommendation and mitigation measures shall be incorporated, under the direction of the SCWA, into the project design specifications to reduce unstable slope conditions per Geoservices' Geologic Feasibility Study.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				A. Where steep or unstable slopes are encountered, implementation of Best Management Practices (BMPs) and other standard engineering practices shall be used. These include the keying-in of engineered slopes, use of retaining walls, slope stability monitoring, and dewatering systems. Appropriate reservoir siting criteria would ensure that storage sites would avoid mapped landslide areas. Standard slope stabilization measures, as approved by the DSOD, shall be implemented to provide adequate dam and reservoir foundation; B. Per Geoservices' Geologic Feasibility Study, options to mitigate the impact of debris slides may include removal of the weathered, debris-slide prone surficial soil zone during reservoir grading; construction of debris catchment measures such as debris fences, a bench/perimeter road to catch debris; or debris basins; and, C. Consistent with General Plan Policy PS-1f, a geologic study report shall be prepared under direction of the SCWA for each reservoir site prior to construction. Each report shall describe the hazards and include mitigation measures to reduce risks to acceptable levels. The design specifications for each reservoir site shall provide an engineer's or geologist's certification that risks have been mitigated to an acceptable level. To assess whether large landslides are present in dam and reservoir areas beyond those already evaluated, Geoservices recommends further evaluation by performing subsurface exploration to determine if in-place bedrock is present as part of each geologic study report.
GEO-2	NSCARP components may be subject to ground rupture due to location near a surface trace of an active fault as measured by location of facilities within an Alquist-Priolo Earthquake Fault Zone.	Significant but Mitigable	2, 3, 4	NSCARP facilities shall be sited as to avoid Alquist-Priolo buffer zones, as determined by the CGS, as much as feasible. Per Geoservices' conclusions, the feasibility of construction of DSOD jurisdictional-size dams in reservoir locations will require additional evaluation of surface fault rupture hazards, as proposed reservoirs located in the eastern portions of the Northern Alexander and Alexander Valley sub-areas would be located in close proximity to the Maacama Fault line. A major earthquake would subject the proposed recycled water pipeline

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				alignments to ground motion and under extreme conditions, and could potentially cause material failure or piping connection failure leading to rupture and release of water; however, the pipeline and associated structures would be designed to accommodate site-specific ground motions greater than those anticipated for this region. Measures to be implemented would include: • Engineering designs, construction practices and materials such as flexible pipes, shall be implemented in a manner that would be resistant to damage from rupture; and, • Performing a limited number of backhoe test pits/trenches across the trace of faults, to observe the units offset by the fault rupture surface and to identify the youngest geologic units offset by the fault.
GEO-3	NSCARP components will be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake, as measured by geotechnical assessments or detailed mapping.	Significant but Mitigable	2, 3, 4	Prior to the approval of construction plans for the proposed project components, design-level geotechnical investigations, including collection of site specific subsurface data, shall be completed by a qualified geotechnical engineer. The geotechnical evaluations shall include identification of density profiles, estimation of approximate maximum shallow groundwater levels, and development of site-specific design criteria to mitigate potential risks.
GEO-4	NSCARP has a low potential to induce seismicity as measured by induced groundshaking intensity.	Less than Significant	2, 3, 4	None required.
GEO-5	NSCARP facilities could potentially be damaged by earthquake-induced groundshaking.	Less than Significant	2, 3, 4	None required.
GEO-6	NSCARP construction has a low probability to cause off-site water-related erosion.	Less than Significant	2, 3, 4	None required.
GEO-7	NSCARP components may be vulnerable to damage due to expansive or corrosive soils.	Significant but Mitigable	2, 3, 4	Under the direction of the SCWA, a qualified geotechnical engineer shall conduct site specific geotechnical investigations in the areas where pipelines and pumping stations would be sited prior to construction. The investigations shall identify appropriate engineering considerations as recommended by a certified engineering geologist or registered

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				geotechnical engineer for planned facilities, including engineering considerations to mitigate the effects of expansive and corrosive soils. Recommendations made as a result of these investigations to protect pipelines and pumping stations from expansive and corrosive soils shall be incorporated into project design specifications.
GEO-8	NSCARP components may be an incompatible land use type in the MRZ-2 classification or designated quarry area.	Significant but Mitigable	2, 3, 4	The SCWA shall ensure proposed pipelines be sited so as to avoid MRZ-2 zones and achieve compatible land use as much as feasible. Recommendations for siting pipelines shall be incorporated into design specifications prior to construction.
GEO-9	NSCARP components have a low probability to adversely affect a hot spring, or other unique geological feature.	No Impact	2, 3, 4	None required.
3.8	**Hydrology and Water Quality**			
HWQ-1	Construction of NSCARP could result in increased erosion and subsequent sedimentation, degradation of surface runoff quality, with impacts to water quality.	Significant but Mitigable	2, 3, 4	The SCWA shall file a NOI prior to construction, direct the contractor to develop and implement a SWPPP, and file a Notice of Termination (NOT) at the end of construction. The SWPPP shall be maintained at the site for the entire duration of construction. The objectives of the SWPPP are to identify pollutant sources that may affect the quality of stormwater discharge and to implement BMPs to reduce pollutants in stormwater discharges. The SWPPP for this proposed action shall include the implementation, at a minimum, of the following elements: • Source identification; • Preparation of a site map; • Description of construction materials, practices, and equipment storage and maintenance; • List of pollutants likely to contact stormwater; • Estimate of the construction site area and percent impervious area;

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				• Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in stormwater runoff, such as detention basins, straw bales, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes; • Proposed construction dewatering plans; • List of provisions to eliminate or reduce discharge of materials to stormwater; • Description of waste management practices; • Spill prevention and control measures; • Maintenance and training practices; and • Sampling and analysis strategy and sampling schedule for discharges from construction activities
HWQ-2	Construction activities associated with excavation could result in the dewatering of shallow groundwater resources and contamination of surface water.	Significant but Mitigable	2, 3, 4	The SCWA shall comply with the following NPDES permit requirements imposed by the RWQCB for dewatering activities: • The NCRWQCB would require compliance with certain provisions in the permit, such as treatment of flows prior to discharge. As such, the SCWA shall discharge the groundwater generated during dewatering with authorization of and required permits from the NCRWQCB; and • The SCWA shall comply with applicable permit conditions associated with the treatment of groundwater prior to discharge.
HWQ-3	NSCARP would increase the amount of impervious surfaces that in turn would alter the drainage pattern or increase local storm runoff volumes that could exceed the capacity of onsite drainage systems. This could cause localized flooding or contribute to a cumulate flooding impact downstream.	Less than Significant	2, 3, 4	None required

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
HWQ-4	Operation of NSCARP has the potential to degrade groundwater quality and alter groundwater flows (discussion of potential public health and safety impacts are discussed in Section 3.12 "Public Health and Safety").	Significant but Mitigable	2, 3, 4	Following construction, the SCWA shall implement a groundwater monitoring program. If groundwater monitoring finds that levels have exceeded established MCLs at storage reservoirs, the SCWA shall investigate the integrity of the clay liner(s) to determine whether any repairs area necessary.
HWQ-5	During the winter months, high seasonal groundwater could intercept the bottom of the proposed reservoirs and possibly rise to a depth above the bottom of the reservoir. The pressure of groundwater could compromise the structural integrity of the reservoirs.	Significant but Mitigable	2, 3, 4	If determined necessary, the SCWA shall construct the reservoirs with clay liners, which should not be affected by high groundwater levels. Following construction, the SCWA shall regularly monitor the reservoirs to determine whether there is any adverse effect to the reservoir liners. If necessary, the SCWA shall make necessary repairs.
HWQ-6	NSCARP could expose people or property to risks related to flooding.	Significant but Mitigable	2, 3, 4	A. The SCWA shall adhere to the standards set by the California Department of Water Resources Division of Safety of Dams in the design and construction of the dams and berms for the reservoirs. The Division of Safety of Dams believes that adherence to these design and construction standards greatly reduces the probability of dam failure and is protective of public safety (Head 1996); and, B. During operation, the SCWA shall visually inspect the reservoirs on a regular basis to ensure that the embankments, control structures, access roads, and monitoring instrumentation are maintained. SCWA shall remove, if found, any impediments from the spillways and other control structures as soon as they are observed.
HWQ-7	NSCARP would increase summer flows in the tributaries of the Russian River and help maintain storage levels in Lake Mendocino, which would improve habitat for fish.	Beneficial	2, 3, 4	None required
HWQ-8	NSCARP could potentially cause groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment.	Less than Significant	2, 3, 4	None required

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
HWQ-9	Operation of NSCARP could result in indirect/direct discharge or dam seepage that result in potential water quality impacts	Significant but Mitigable	2, 3, 4	The SCWA shall incorporate the following standard engineering mitigation measures into the final design of the pipelines to minimize the effects of pipeline ruptures: • Flexible joints • Welded joints • Pressure sensors • Visual inspection
3.9	**Land Use**			
LU-1	NSCARP has the potential to physically divide a community.	Less than Significant	2, 3, 4	None required
LU-2	NSCARP has the potential to conflict with goals, objectives, and policies identified in the Sonoma County General Plan.	Significant and Unavoidable	2, 3, 4	Implement Mitigation Measure AG-1
LU-3	The Proposed Project has the potential to conflict with the USFWS Recovery Plan for California Freshwater Shrimp and the Recovery Plan for the California Red-Legged Frog.	Less than Significant	2, 3, 4	None required
LU-4	NSCARP has the potential to introduce inappropriate uses in a Community Separator.	Significant but Mitigable	2, 3, 4	Implement Mitigation Measure AES-1
3.10	**Noise**			
NOI-1	Construction or operation of the NSCARP may generate noise levels in excess of standards established in the local general plan, noise ordinance, or applicable standards of other agencies.	Significant but Mitigable	2, 3, 4	A. The SCWA shall ensure that noise disturbances at sensitive receptors during construction activities are reduced, per the County of Sonoma's General Plan Noise Element standards and the State Office of Noise Control Construction Noise Limits, to the extent feasible. Measures may include: • Equipment with improved noise muffling shall be used, and manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators, shall be intact and operational;

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				• Construction equipment shall require weekly inspection to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding, etc.); • Wherever possible, hydraulic tools shall be used instead of pneumatic impact tools; • Construction activities shall be limited to the hours between 7:00 a.m. and 7:00 p.m.; • Where feasible, heavy truck trips shall be routed over streets or roads that will cause the least noise disturbance to residences or businesses in the vicinity of the construction activity; • Where feasible, construction staging areas, maintenance yards, and other construction-oriented operations shall be located to limit potential impacts to sensitive receptors; and, • Significantly affected sensitive noise receptors shall be specifically identified and notified in advance to keep windows and doors closed during peak construction activity.
NOI-2	NSCARP construction activities may result in generation of excessive ground-borne vibration levels.	Significant but Mitigable	2, 3, 4	Construction contractors selected by the SCWA shall utilize techniques that minimize ground-borne vibration (e.g., locate equipment as far away from sensitive receptors as feasible and avoid operating multiple pieces of equipment simultaneously near sensitive receptors) to the greatest extent feasible. These measures shall be incorporated into project specifications prior to commencement of construction.
NOI-3	Operation of the NSCARP may cause a substantial permanent increase in ambient noise levels above existing noise levels in the project vicinity.	Significant but Mitigable	2, 3, 4	Implement Mitigation Measure NOI-1
NOI-4	NSCARP potentially will expose people to noise in the vicinity of a public or private airport	Significant but Mitigable	2, 3, 4	SCWA shall assure all construction workers at the airport will comply with hearing protection measures. This would reduce the potential for permanent hearing loss and reduce the potential impact to less than significant levels.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
3.11	**Population and Housing**			
POP-1	NSCARP would extend recycled water infrastructure within the project area.	Less than Significant	2, 3, 4	None required
POP-2	NSCARP would have the potential to displace existing housing.	Less than Significant	2, 3, 4	None required
POP-3	NSCARP would have the potential to displace substantial numbers of people.	Less than Significant	2, 3, 4	None required
3.12	**Public Health and Safety**			
PUB-1	NSCARP may potentially expose workers or the public to contaminated soils during excavation activities, causing an increase in the risk of exposure.	Significant but Mitigable	2, 3, 4	Prior to construction, the SCWA shall develop, and subsequently implement during construction, a Construction Management Program (CMP). Potential hazardous waste release sites would be identified prior to construction by performing an Initial Site Assessment as part of the CMP to identify hazardous waste release sites within 500 feet of pipeline and pump stations construction, as well as reservoir facilities. Identification and proper management of any contaminated groundwater encountered during construction would mitigate impacts to a less than significant level. The following measures may be included as part of the CMP: • In the vicinity of hazardous materials/waste release sites, construction activities related to the project that require excavation or exposure of soil or groundwater shall be monitored by the contractor for subsurface contamination. The SCWA shall notify responsible agencies if any hazardous materials/wastes are encountered. Monitoring shall include, at minimum, visual observation by personnel with appropriate hazardous materials training, including 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training;

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				• In the vicinity of hazardous materials/waste release sites, groundwater brought to the surface as a result of construction dewatering shall be handled in a manner appropriate to the construction-related permits for dewatering. If contamination is suspected or noted during the construction phase, then the groundwater shall be containerized and analyzed for contamination by a laboratory, certified by the CalEPA Environmental Laboratory Accreditation Program (ELAP), using USEPA-approved analytical methods. Where contaminated groundwater is encountered, precautions shall be taken to assure that the installation of piping or other construction activities do not further disperse contamination; and, • All potentially contaminated materials encountered during project construction activities shall be evaluated in the context of applicable local, state, and federal regulations and/or guidelines governing hazardous waste. All materials deemed to be hazardous shall be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines. Disposal sites for both remediated and non-remediated soils shall be identified prior to beginning construction. Management of these sites shall be documented in a Material Management Plan acceptable to applicable agencies. All evaluation, remediation, treatment and/or disposal of hazardous waste shall be supervised and documented by qualified hazardous waste personnel.
PUB-2	NSCARP could result in an accidental upset of hazardous materials used during construction that increases the risk of exposure to the environment, workers, and the public.	Significant but Mitigable	2, 3, 4	A. Consistent with the SWPPP requirements identified in Section 3.8 Hydrology and Water Quality, SCWA shall require the contractor to implement Best Management Practices (BMPs) for handling hazardous materials onsite. The use of construction BMPs will minimize adverse effects on groundwater and soils, and will include, without limitation, the following: • Follow manufacturers' recommendations and regulatory requirements for use, storage, and disposal of chemical products and hazardous materials used in construction; • Avoid overtopping construction equipment fuel gas tanks;

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				• During routine maintenance of construction equipment, properly contain and remove grease and oils; and • Properly dispose of discarded containers of fuels and other chemicals. B. SCWA shall follow the provisions of California Code of Regulations, Title 8, Sections 5163 through 5167 for General Industry Safety Orders to protect the project area from being contaminated by the accidental release of any hazardous materials and/or wastes. Disposal of all hazardous materials will be in compliance with applicable California hazardous waste disposal laws. SCWA will contact the local fire agency and the County Department of Public Health, Environmental Health Division, for any site-specific requirements regarding hazardous materials or hazardous waste containment or handling; C. In the event of an accidental release of hazardous materials during construction, containment and clean up shall occur in accordance with applicable regulatory requirements; D. Oil and other solvents used during maintenance of construction equipment shall be recycled or disposed of in accordance with applicable regulatory requirements. All hazardous materials shall be transported, handled, and disposed of in accordance with applicable regulatory requirements. E. If hazardous materials are encountered during construction activities, the contractor will be required to halt construction immediately and notify the SCWA Construction Compliance Section. Disposal of all hazardous materials will be in compliance with all applicable California hazardous waste disposal laws. F. Prepare and implement a Safety Program to ensure the health and safety of construction workers and the public during project construction. The Safety Program will include an injury and illness prevention program, a site-specific Safety Plan, and information on the appropriate personal protective equipment to be used during construction.

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
PUB-3	Operation of NSCARP facilities would require the use of hazardous materials and may increase the risk of exposure to hazardous materials.	Significant but Mitigable	2, 3, 4	Implement Mitigation Measure PUB-2(B)
PUB-4	NSCARP may expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations.	Less than Significant	2, 3, 4	None required
PUB-5	Construction activities in grassland areas would have the potential to expose people or equipment to risk or loss, injury, or death involving wildland fires.	Significant but Mitigable	2, 3, 4	A. Prior to construction, the SCWA shall work closely with local fire agencies to develop a fire safety plan that describes various potential scenarios and actions to be implemented in the event of a fire; B. During construction, all staging areas, welding areas, or areas slated for construction using spark-producing equipment shall be cleared of dried vegetation or other material that could ignite. Any construction equipment that includes a spark arrestor shall be equipped with a spark arrestor in good working condition. During the construction of the project, SCWA shall require all work vehicles and construction crews to have access to functional fire extinguishers at all times.
PUB-6	NSCARP could potentially cause an increase in the exposure of the public to disease vectors (i.e., mosquitoes).	Significant but Mitigable	2, 3, 4	The SCWA shall, where feasible, design NSCARP facilities in a manner that minimizes favorable conditions for the development of potential mosquito habitat as described in the DHS and the Marin/Sonoma Mosquito Abatement District's Criteria for Mosquito Prevention in Wastewater Reclamation or Disposal Projects. The criteria identify three general principles of mosquito control: (1) the manipulation of the physical features of the impoundment, (2) biological control, and (3) chemical control. Specific measures could potentially include: • Water bodies shall have an access ramp constructed on an inside slope for launching a small boat to conduct midge sampling and control; • A maintenance program for weeds and erosion control on the inner slopes of the water body; • Biological controls shall be used, such as stocking the reservoir with mosquito fish (*Gambusia affinis*); and,

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				• Irrigation sites shall not have water ponding deeper than one inch for a period greater than four days during the breeding season.
PUB-7	NSCARP would result in the use of recycled water for agricultural irrigation. The recycled water applied to the irrigated lands could possibly affect public health.	Significant but Mitigable	2, 3, 4	A. The SCWA shall require that a Recycled Water User Agreement (RWUA), an agreement between SCWA and each water user, be developed prior to the water user receiving recycled water. The RWUA shall include provisions that require recycled water to be applied compatible with good farming practices on land, consistent with runoff, ponding, and environmental restrictions (complying with Title 22 requirements) such as prohibit the over-application of recycled water (and subsequent ponding or surface runoff). Continued implementation of these measures would ensure that Title 22 requirements are met, that surface waters are protected, and that potential impacts to groundwater levels and water quality would be minimized, thus, ensuring no impact to public health. The SCWA shall be responsible for periodic monitoring of each NSCARP water user's practices to ensure that their ongoing use of the recycled water is consistent with Title 22 requirements and the RWUA. B. Implement Mitigation Measure HWQ-4.
PUB-8	NSCARP would result in the storage of recycled water, which could possibly affect public health.	No Impact	2, 3, 4	None required
PUB-9	NSCARP could potentially result in release of recycled water from pipelines that could possible affect public health.	Less than Significant	2, 3, 4	None required
PUB-10	NSCARP recycled water may contain unregulated compounds, such as EDCs, which could affect public health.	N/A	2, 3, 4	Because of the evolving research on the issue of EDCs and xenobiotics, SCWA will perform the following: • Monitor on-going research to stay abreast of the state-of-the-science concerning EDCs and Xenobiotics; • Consult and coordinate with the RWQCB, USEPA, and other regulatory agencies on developing standards and promulgating regulations;

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				• Implement appropriate treatment technologies, as required by regulatory agencies; and, • Formulate and implement adaptive management procedures to respond to changes in regulations.
3.13	**Recreation**			
REC-1	NSCARP could result in increased use of or deterioration of existing recreation facilities.	Less than Significant	2, 3, 4	None required
REC-2	NSCARP could result in temporary access restrictions at existing recreation facilities.	Less than Significant	2, 3, 4	None required
3.14	**Transportation/Traffic**			
TRA-1	NSCARP potentially would cause an increase in local traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).	Significant but Mitigable	2, 3, 4	A. The SCWA shall adopt and implement a Traffic Control Plan prior to commencing project construction, which will include measures for reducing construction-related impacts to traffic and accessibility within the project area. The Traffic Control Plan shall include, but not be limited to, the following measures: • Coordinate with the affected residents, businesses and agencies regarding construction hours of operation and lane closures; • Follow guidelines of the local jurisdiction for road closures caused by construction activities; • Coordinate with the Sonoma County Transit System and the applicable school districts on construction hours of operation, lane closures, and temporary bus route delays; • Encourage construction contractors to carpool to and from work sites to reduce overall number of worker-vehicle trips; • Limit lane closures during peak commuting hours to the extent possible; • Install traffic control devices as specified in the Caltrans' Manual of Traffic Controls for Construction and Maintenance Works Zones;

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				• Provide public notification of road closures and detour routing for all vehicle detours and lane shifts in the immediate vicinity of the open trenches in the construction zone; • Provide access to driveways and private roads outside the immediate construction zone; • Develop a business notification plan for access to local business in and adjacent to the construction zone; • Provide notification to the public of temporary closures of sidewalks, bicycle lanes, and recreation trails; and, • Consult with emergency service providers and develop an emergency access plan for emergency vehicles access in and adjacent to the construction zone. B. The SCWA shall obtain and comply with local road encroachment permits for roads that are affected by construction activities prior to any construction activity within public roads and rights-of-way.
TRA-2	The SCWA shall obtain and comply with local road encroachment permits for roads that are affected by construction activities prior to any construction activity within public roads and rights-of-way.	Less than Significant	2, 3, 4	None required
TRA-3	NSCARP construction potentially could substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	Less than Significant	2, 3, 4	None required
TRA-4	NSCARP construction potentially could result in significant traffic delays resulting in inadequate emergency access.	Significant but Mitigable	2, 3, 4	Implement Mitigation Measure TRA-1
TRA-5	NSCARP potentially could result in inadequate parking capacity (especially during construction activities) or inadequate business/residence access.	Significant but Mitigable	2, 3, 4	Implement Mitigation Measure TRA-1

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
TRA-6	NSCARP potentially could conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).	Significant but Mitigable	2, 3, 4	Implement Mitigation Measure TRA-1
3.15	**Utilities/Service Systems**			
UTL-1	NSCARP could potentially exceed wastewater treatment requirements of the North Coast Regional Water Quality Control Board.	Less than Significant	2, 3, 4	None required
UTL-2	NSCARP potentially could require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects or result in inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	Beneficial	2, 3, 4	None required
UTL-3	NSCARP potentially could require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	Less than Significant	2, 3, 4	None required
UTL-4	NSCARP potentially may require a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs and comply with federal, state, and local statutes and regulations related to solid waste.	Less than Significant	2, 3, 4	None required
UTL-5	NSCARP potentially could result in un-repaired damage or an extended disruption in service provided by a utility.	Significant but Mitigable	2, 3, 4	A. The SCWA shall identify utilities along the affected portions of the NSCARP prior to construction. For locations with adverse impacts, the following mitigations shall be implemented: • Utility locations shall be verified through the use of the Underground Service Alert services and/or field survey (potholing);

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
				• As necessary, detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and fill of areas around utility cables and pipes. All affected utility services shall be notified of construction plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services; • In areas where the pipeline would parallel underground utility lines within five feet, the SCWA shall employ special construction techniques. These special measures, which shall be included in the engineering specifications, shall include trench wall-support measures to guard against trench wall failure and possible resulting loss of structural support for the excavated areas; and, • Residents and businesses in the project corridor shall be notified of any planned utility service disruption two to four days in advance, in conformance with county and state standards. B. In conjunction with Mitigation Measure UTL-1, the following measures shall be implemented: • Disconnected cables and lines shall be reconnected promptly; • The SCWA shall observe DHS standards which require (1) a 4-foot horizontal separation between parallel disinfected tertiary recycled water lines and water mains (gravity or force mains); and (2) 1-foot vertical separation between perpendicular water and disinfected tertiary recycled water line crossings (water line above recycled water line). In the event that separation requirements can not be maintained, the SCWA shall obtain DHS variance; and, • The SCWA shall coordinate final construction plans and specifications with affected utilities.
UTL-6	NSCARP potentially could result in the need for new or expanded police protection, fire protection, and/or school facilities.	No Impact	2, 3, 4	None required

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
UTL-7	NSCARP potentially could exceed planned electrical supply capacity of the electrical service provider servicing the region.	Less than Significant	2, 3, 4	None required
4.0	**Cumulative Impacts**			
AES	The NSCARP could potentially contribute to cumulatively significant impacts to aesthetics and visual resources.	Less than Significant	2, 3, 4	None required
AG	The NSCARP could potentially contribute to cumulatively significant impacts to agricultural resources.	Significant and Unavoidable	2, 3, 4	None available
AQ	The NSCARP could potentially contribute to cumulatively significant impacts to air quality.	Less than Significant	2, 3, 4	None required
BIO	The NSCARP could potentially contribute to cumulatively significant impacts to biological resources.	Significant and Unavoidable	2, 3, 4	None available
CUL	The NSCARP could potentially contribute to cumulatively significant impacts to cultural resources.	Less than Significant	2, 3, 4	None required
ENV	The NSCARP could potentially contribute to cumulatively significant impacts to environmental justice.	Less than Significant	2, 3, 4	None required
GEO	The NSCARP could potentially contribute to cumulatively significant impacts to geology and soils.	Less than Significant	2, 3, 4	None required
HWQ	The NSCARP could potentially contribute to cumulatively significant impacts to hydrology/water quality.	Less than Significant	2, 3, 4	None required
LU	The NSCARP could potentially contribute to cumulatively significant impacts to land use.	Less than Significant	2, 3, 4	None required

Table ES-1. (Continued)

Impact		Impact Category	Applicable Alternative	Mitigation Measures
NOI	The NSCARP could potentially contribute to cumulatively significant impacts from noise.	Less than Significant	2, 3, 4	None required
POP	The NSCARP could potentially contribute to cumulatively significant impacts to population and housing.	Less than Significant	2, 3, 4	None required
PUB	The NSCARP could potentially contribute to cumulatively significant impacts to public health and safety.	Less than Significant	2, 3, 4	None required
REC	The NSCARP could potentially contribute to cumulatively significant impacts to recreation.	Less than Significant	2, 3, 4	None required
TRA	The NSCARP could potentially contribute to cumulatively significant impacts to transportation/ traffic.	Significant but Mitigable	2, 3, 4	Mitigation Measure CUM-1: Incorporate and implement the following measure from the Traffic Control Plan: The SCWA shall communicate and coordinate project construction activities with other agencies in the NSCARP area, possibly including PG&E, Sonoma County Department of Transportation and Public Works, and Caltrans. Phasing of project construction shall be coordinated when feasible to minimize cumulative impacts. Furthermore, the SCWA shall coordinate, with any appropriate agency, traffic mitigation measures to minimize the cumulative effect of simultaneous construction activity in overlapping areas, including utility disruptions.
UTL	The NSCARP could potentially contribute to cumulatively significant impacts to utilities and service systems.	Significant but Mitigable	2, 3, 4	Implement Mitigation Measure CUM-1
5.0	**Growth-Related Effects**			
GRO-1	Growth Related to Direct and Indirect Employment	Less than Significant	2, 3, 4	None required
GRO-2	Growth Related to New Housing	Less than Significant	2, 3, 4	None required
GRO-3	Growth Related to Removing Obstacles to Growth (Provision of Additional Recycled Water)	Less than Significant	2, 3, 4	None required

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Chapter 1

Purpose of and Need for the North Sonoma County Agricultural Reuse Project

Chapter 1. Purpose and Need for the North Sonoma Agricultural Reuse Project

1.1 INTRODUCTION

The Sonoma County Water Agency (SCWA) is proposing to construct the North Sonoma County Agricultural Reuse Project (NSCARP). The basic project purpose of NSCARP is to reduce reliance on natural regional water supplies by using recycled water on agricultural lands. Approximately 21,500 acres of presently developed agricultural lands (vineyards, dairies, and orchards) within the Russian River, Alexander and Dry Creek valleys would be served by recycled water. The water supply for NSCARP would be tertiary-treated wastewater generated by the City of Santa Rosa (City), Town of Windsor (Town), and Airport/Larkfield/Wikiup Sanitation Zone (ALWSZ) facilities, and conveyed to the project primarily through the City's Geysers Pipeline. NSCARP involves the design and construction of 19 recycled water storage reservoirs totaling about 11,200 acre-feet (af) in storage capacity. In addition, NSCARP would involve the design and construction of approximately 112 miles of transmission pipeline and numerous pumping stations for conveying water from the Geysers Pipeline to the storage reservoirs, and for distribution of the storage recycled water from the reservoirs to the agricultural lands.

SCWA is proposing NSCARP to meet this basic project purpose and the other purposes described under Section 1.2 (Project Purpose/Objectives and Need).

This document is a joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS) and satisfies the requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). It will be used by local, state, and federal agencies to identify, evaluate, and disclose significant environmental impacts of the proposed action and alternatives as described in Chapter 2.0.

SCWA has determined that preparation of an EIR to satisfy CEQA (Public Resources Code, Section 21000 et seq.) is required before approval of the NSCARP. SCWA is the lead agency under CEQA. The primary purpose of an EIR is to identify and publicly disclose any significant environmental impacts that may result from implementation of a project and to identify feasible alternatives, mitigation measures, or revisions to the project that would reduce those impacts.

Pursuant to Section 15126(d) of the CEQA Guidelines, an EIR must describe and evaluate a reasonable range of alternatives that would feasibly attain most of the basic project objectives, and would avoid or substantially lessen any of the significant impacts of the project as proposed. The guidelines state that the range of alternatives required to be evaluated in an EIR is governed by the "rule of reason": the EIR needs to describe and evaluate only those alternatives necessary to permit a reasoned choice and to foster informed decision-making and public participation.

Like CEQA, NEPA and the Council on Environmental Quality's NEPA implementing regulations (Title 40, Code of Federal Regulations [CFR], Section 1500 et seq.) require federal agencies, when proposing to carry out, approve, or fund a project, to evaluate the environmental effects of the action, including feasible alternatives and mitigation measures to minimize adverse effects that may trigger NEPA.

The U.S. Department of Interior, Bureau of Reclamation (Reclamation) provided grant funding for preparation of a feasibility study for the North Sonoma County Agricultural Reuse Project (NSCARP) pursuant to Title XVI of Public Law 102-575, as amended. There is the potential that Congress would authorize and appropriate partial funding for the design and construction of NSCARP under PL102-575, Title XVI. Based on this authorization and appropriation, Reclamation could provide up to 25 percent of project construction cost to a maximum Federal cost share contribution of $20 million (October 1996 prices). Due to the potential for Federal funding, Reclamation is lead Federal agency under NEPA.

Because of the complex nature of the NSCARP, Reclamation and SCWA have determined that preparation of an EIS is the most appropriate form of NEPA compliance. Other federal agencies, such as the U.S. Army Corps of Engineers (Corps), U.S. Fish and Wildlife Service (Service), and National Oceanic Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries), may rely on the EIS to satisfy NEPA for their individual approvals of project components.

Three project alternatives are analyzed in this EIR/EIS at an equal level of detail and compared against a no-action alternative (Alternative 1). Each of the action alternatives are intended to meet the purpose, objectives, and need identified by the SCWA.

Alternative 2 involves the entire NSCARP, which would involve development of 19 recycled water storage reservoirs totaling about 11,200 af of storage capacity. It would also include development of about 112 miles of large-diameter transmission pipeline and numerous pumping stations for conveying water from the source of recycled water to the storage reservoirs, and for distribution of stored water from the reservoirs to agricultural lands.

Alternative 3 involves the Alexander Valley-Jordan Reservoir Subset, which would include construction of two proposed reservoirs for an estimated total combined storage capacity of about 1,821 af and construction of about 16.7 miles of large-diameter transmission pipeline.

Alternative 4 involves the Russian River Valley-Westside Subset, which would include construction of three proposed reservoirs in the hills west of the Russian River and the use of an existing reservoir. The estimated total combined storage capacity for the four reservoirs is about 1,145 af. The alternative would involve construction of about 11.1 miles of large-diameter transmission pipeline and two pumping stations.

The estimated project cost for the primary system components for NSCARP in its entirety (Alternative 2) is estimated to be $375.2 million, as shown in Table 1-1. Estimated capitalized cost would be $27.2 million, based on an interest rate of six percent over a 30-year term.

Table 1-1. Estimated Project Costs

Geographical Area	Estimated Project Cost (millions)	Estimated Capitalized Project Cost (millions)
Alexander Valley	$110.8	$8.1
Dry Creek	$94.9	$6.9
North Alexander Valley	$102.4	$7.4
Russian River Valley	$77.0	$5.6

1.2 PROJECT PURPOSE/OBJECTIVES AND NEED

NSCARP is intended to contribute to meeting the objectives of SCWA and Reclamation. The primary needs, purposes, and objectives of the project are as follows:

Needs

- Federal and state regulatory agencies have expressed concern regarding potential impacts to fisheries resources and habitat within the Russian River and its tributaries. Currently, agricultural lands in the NSCARP area are irrigated with water originating from the Russian River, its tributaries, and groundwater. There is a need to allow water to remain in the Russian River system and its tributaries to improve habitat for listed fish species. There also is a need for adequate infrastructure to store and distribute recycled water produced by various entities for reuse throughout the region.

Purposes/Objectives

- Provide a reliable, long-term water supply for agricultural interests;
- Reduce discharges from local wastewater treatment plants to local waterways;
- Reduce the use of groundwater and surface water for agricultural purposes in north Sonoma County;
- Provide an environmentally responsible, long-term method of recycled water use; and,
- Increase reliability and long-term sustainability of the regional water supply.

1.3 BACKGROUND OF PURPOSE AND NEED

Sonoma County Water Agency

SCWA is a special district created by California legislation in 1949. It supplies water to cities and public agencies throughout most of the populated areas of Sonoma County and northern Marin County, and is responsible for regulating the flow of the Russian River with releases of water from Lake Mendocino and Lake Sonoma. SCWA also provides wastewater management services to areas within Sonoma County, is responsible for flood control projects in cooperation with federal, state and local agencies, and operates a hydroelectric facility to generate electrical energy. The mission of SCWA is to effectively manage the water resources in its care for the benefit of people and the environment through resource and environmental stewardship, technical innovation, and responsible fiscal management.

In 1997, the SCWA conducted a Recycled Water Workshop for regulatory agencies and agricultural and environmental groups for evaluating the feasibility of a Sonoma County recycled water distribution system. The workshop identified Alexander, Russian River and Dry Creek valleys as areas where recycled water could be used for agricultural purposes. SCWA's Board of Directors authorized staff to seek funding sources for projects and activities that support water use and develop agreements with agricultural users in conjunction with other regional water suppliers for storage and use of recycled water.

In 1999, the North Sonoma County Water Conservation Corporation (Corporation) was formed to secure a reliable water supply for irrigation and related agricultural purposes within north Sonoma County. The water supply system envisioned involved developing facilities to make recycled water from the City's system and possibly other wastewater operators in the area available for agricultural purposes via the City's Geysers Pipeline. A system of storage reservoirs would be filled during periods when excess recycled water from the Geysers Pipeline is available for agricultural uses. The reservoirs would serve certain lands that are within a reasonable proximity to the supply reservoirs through a pipeline distribution network. The Corporation is now known as the Coalition for Sustainable Agriculture (CSA).

In 2003, the City of Santa Rosa's Geysers Recharge Project began delivering approximately 11 million gallons per day (mgd) of tertiary-treated recycled water from the City's system via a 41-mile underground pipeline to the Geysers steam field to generate electricity. This 48-inch diameter pipe contains recycled water turnouts that allow for potential reuse along a route within the Alexander, Russian River, and Dry Creek valleys.

Subsequent to the Geysers Pipeline becoming operational, the City approved the Incremental Recycled Water Program (IRWP). The City completed a program EIR that identified several options to maximize reuse opportunities and best use its recycled water while protecting public health and the environment (City of Santa Rosa, 2004). One alternative listed within the City's program EIR identifies the use of recycled water for agricultural irrigation, in part, within the Russian River area between the communities of Windsor and Healdsburg and the Alexander Valley and Dry Creek Valley areas. Recycled water would be delivered to these areas via the Geysers Pipeline, which is adjacent to these areas.

Need for the Project

Federal and state regulatory agencies have expressed concerns regarding the potential impacts to fisheries resources and habitat within the Russian River and its tributaries. These concerns have and will continue to result in increased scrutiny of future diversion of water for all uses. The coho salmon is listed as endangered in the Russian River watershed and adjacent watersheds pursuant to the Federal Endangered Species Act (FESA). Chinook salmon and steelhead were similarly listed in 1997 and 1999, respectively. Through the proposed distribution, storage, and use of recycled water for agricultural purposes, the SCWA has identified a strategy to reduce reliance on diversions from the Russian River and other natural waterways, and demand on groundwater supplies.

The use of recycled water for irrigation for agricultural purposes has been occurring in California since 1890 (California Recycled Water Task Force, 2003). By the year 2000, there were 234 wastewater treatment plants providing recycled water for agricultural and landscape purposes in California (California Recycled Water Task Force, 2003) Today, recycled water in California is being used for a variety of purposes, such as irrigation for row crops, vineyard, pasture, stock feed, nursery products, turf in parks and schoolyards, and landscaping. In northern Sonoma County, the City of Santa Rosa (City), Town of Windsor (Town), and the Airport-Larkfield-Wikiup (ALWSZ) currently provide recycled water for irrigation of about 8,638 acres of agricultural land.

The instream flow requirements of the Russian River were established by the SWRCB in Decision 1610 (D1610). The SCWA operates the Russian River system pursuant to D1610 for the benefit of agricultural, municipal, and instream beneficial uses. The use of recycled water and conjunctive use of surface and groundwater supplies within the SCWA service area are all important factors in evaluating the management of the regional water supply. SCWA believes the use of recycled water to offset surface and groundwater sources used by agricultural entities in the Russian River, Alexander, and Dry Creek valleys would benefit fisheries in the Russian River watershed. The recycled water would be used for agricultural purposes consistent with the California Code of Regulations, Title 22 pertaining to the use of tertiary-treated recycled water.

NSCARP would result in fewer agricultural diversions from the Russian River and its tributaries, which would enable the SCWA to release less water from storage in Lake Mendocino and Sonoma to meet water demands and instream flow requirements. This would result in more water being conserved in storage in these reservoirs, which would provide more operational flexibility for the SCWA to benefit fisheries sources in the Russian River. The increased operational flexibility would not result in additional water being available for other uses because existing reservoir storage capacity, water rights, and flow requirements would not change.

1.4 ORGANIZATION OF EIR/EIS

This EIR/EIS is organized in the following Chapters:

- Chapter 1 - Purpose of and Need for the North Sonoma Agricultural Reuse Project;
- Chapter 2 - Project Description;
- Chapter 3 - Environmental Impact Analysis;
- Chapter 4 - Cumulative Effects;
- Chapter 5 - Growth-Related Effects;
- Chapter 6 - Impact Conclusions;
- Chapter 7 - Consultation and Coordination;
- Chapter 8 - References;
- Chapter 9 - List of Preparers; and,
- Appendices

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Chapter 2
Project Description

Chapter 2. Project Description

2.1 PROJECT OVERVIEW

The SCWA is proposing to construct and operate the NSCARP to store and distribute recycled water to agricultural lands within the Russian River, Dry Creek, and Alexander Valleys to offset use of natural regional water supplies.

Characteristics of Study Area

Description of Regional Area

Sonoma County is located in the northwestern region of California. As shown in Figure 2-1, the Russian River originates in Mendocino County and flows approximately 50 miles southwesterly through Sonoma County terminating at the Pacific Ocean near the community of Jenner. Much of the lands lying adjacent to the Russian River and within the Dry Creek Valley are developed in intensive agriculture, primarily vineyards. Other lands uses within the Russian River watershed in Sonoma County are urban (cities and towns, such as Cloverdale, Geyserville, Healdsburg, Santa Rosa, and Windsor), and undeveloped rangeland.

Identification of NSCARP area

The NSCARP area encompasses portions of Sonoma County, including four geographical areas within the Russian River watershed: Alexander Valley, Dry Creek Valley, North Alexander Valley and Russian River Valley. These areas are shown in Figure 2-2, and comprise about 47,000 acres. These four subareas correspond to discrete service areas that would be provided recycled water by subarea-specific water storage and transmission facilities.

Climate

The NSCARP area is situated in Climate Zone 14, which includes inland areas of Northern California with some ocean influence. This zone has inland areas with warmer winter weather and cooler summer weather than surrounding areas due to marine air influxes (Williamson, 1985). In general, weather along the Russian River is mild with only a few days exceeding 100^{o}F. The trade winds off the Pacific Ocean tend to cool western and central areas of Sonoma County most of the year, and from April until early September, fog may occur in morning hours, but burns off before noon (Best *et al.*, 1996). These hot summer months and mild wet winters are typical of a Mediterranean-type climate.

Based on a 29-year period of record from the Warm Springs Dam meteorological station (Station No. 049440), the mean annual precipitation is 43.39 inches with the average maximum monthly level of 9.5 inches occurring in January, and the average minimum monthly level of 0.07-inch in July (WWRC, 2005). However, precipitation is highly variable among years. Over

80 percent of the annual rainfall occurs between November and March. The average annual maximum temperature is 73.5°F, with the highest average monthly temperature of 89.4°F in July. The annual minimum average temperature is 44.6°F, with the lowest minimum monthly temperature of 36.2°F in December. Due to the influence of the Pacific Ocean, temperatures are rarely low enough to freeze for prolonged periods, and snow only occurs briefly at high elevations. The freeze free period is between 233 and 272 days (probabilities between 30 and 70 percent at 32°F) (NCDC, 2004).

Hydrology

The Russian River and Dry Creek are the primary watercourses passing through the study area. The Russian River originates in Mendocino County and flows southerly thence westerly through Sonoma County, discharging to the Pacific Ocean at the community of Jenner (see Figure 2-1). Dry Creek originates in southern Mendocino County and flows southeasterly through Sonoma County to the Russian River. These watercourses are fed by numerous perennial and intermittent tributary streams. While the Russian River and Dry Creek maintain some hydrologic characteristics typical of northern California coastal streams (high winter flows, low summer flows), the development of two relatively large storage reservoirs (Lake Sonoma and Lake Mendocino), and numerous smaller agricultural and municipal diversions, along with diversion of 150,000 af of Eel River water into the East Fork of the Russian River by Pacific Gas & Electric Company (PG&E) through its Potter Valley Project hydroelectric facilities, has altered the natural hydrology.

On the Russian River, some 25 to 30 miles upstream of the NSCARP area, Coyote Valley Dam (Lake Mendocino) impounds about 122,000 af, and is used to store and regulate wet season runoff (flood control) as well as water diverted by PG&E (DWR, 2000). On Dry Creek, approximately 12 miles upstream of the confluence with the Russian River, Warm Springs Dam (Lake Sonoma) impounds about 381,000 af for storage, regulation, and flood control purposes (DWR, 2000). The SCWA and the Corps operate both reservoirs for water conservation and flood control, respectively. The SCWA uses the Russian River and Dry Creek channels as conveyances for water released from the reservoirs and rediverted for municipal uses within its service area. The SCWA maintains instream flows as required by its water rights for multiple benefit, including fisheries and recreation purposes. The Russian River system is operated pursuant to D1610 for the benefit of agricultural, municipal, and instream beneficial uses.

The U.S. Geological Survey (USGS) has historically operated flow gaging stations in the Russian River watershed. A summary of historical gaged flows at two USGS gaging stations within the NSCARP area is shown in Table 2-1, noting, again, that these flows are impaired and regulated to the extent of diversions and impoundments existing during the period of record.

Figure 2-1. NSCARP Vicinity Map

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Figure 2-2. NSCARP Four Geographical Areas

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Table 2-1. Historical Gage Flows of Russian River and Dry Creek

USGS No.	Name	Period of Record	Mean Annual Flow (af)	Mean Monthly Flow	
				Lowest Month (af)	Highest Month (af)
#11464000	Russian River Near Healdsburg	Oct. 1939 to Sept. 2003	1.04 million	11,300	250,600
#11465000	Dry Creek below Warms Springs Dam near Geyserville	Oct. 1981 to Sept. 2003	172,000	4,900	30,700

Current Land Uses

Current land use in the NSCARP area is predominately agricultural and undeveloped lands. Agricultural lands represent about 79 percent of the total NSCARP area, and are concentrated in the flat valley areas along the Russian River and Dry Creek, and in the low foothills upslope. Agricultural land is predominately wine-grape vineyards, with small areas of orchard and irrigated pasture. For purposes of this EIR/EIS, "pasture" refers to irrigated open land, as well as undeveloped and unforested open grassland that is not presently irrigated. The overwhelming majority of pasture in each area is presently non-irrigated open grassland.

Undeveloped lands consists of grassland and woodland of varying density, primarily located in the steeper and higher elevation areas of the hills above the valleys. Nearby the NSCARP area are small municipalities and urban areas, including the cities of Healdsburg, Windsor, and Cloverdale, and the community of Geyserville.

The NSCARP area is located within the Russian River Hydrologic Unit (HUC 18010110) (USGS, 2005), which encompasses approximately 1,485 square miles in Mendocino and Sonoma counties. The Russian River originates 16 miles north of the City of Ukiah and flows 110 miles to its estuary in the community of Jenner (USACE, 2000). It flows south through the Redwood, Ukiah, Hopland, and Alexander valleys, and the northwestern part of the Santa Rosa Plain. At Mirabel Park, the river turns west and flows toward Jenner. These valleys are separated by mountains. Elevations in the watershed range from 0 to 4,480 feet, msl (RRIIS, 2005). Major tributaries to the Russian River include East Fork Russian River, Sulphur Creek, Maacama Creek, Dry Creek, and Mark West Creek.

Four Geographical Subareas

The NSCARP area is divided into four geographical subareas. The division of the NSCARP into subareas effectively would allow each subarea to be developed individually and sequentially. Each subarea is "self-contained" with respect to recycled water storage, distribution, and use (i.e., there are no interties between the subareas). Land areas associated with each subarea are shown in Table 2-2.

Table 2-2. Summary of NSCARP Land Uses
(all values in acres)

Subarea	Gross Area	Agricultural Parcel Area	Orchard	Pasture	Vineyard	Other[1]
Alexander Valley	11,188	10,680	23	1,254	6,624	3,287
Dry Creek Valley	13,644	10,352	188	199	5,090	7,348
Northern Alexander Valley	7,777	6,681	47	540	4,219	2,971
Russian River Valley	14,581	9,755	23	1,688	4,483	8,387
Total	47,190	37,468	281	3,681	21,235	21,993

[1]Include municipal, institutional, commercial, and undeveloped lands.

Land use in each subarea is overwhelmingly agricultural and open space. Other land uses include municipal, rural residential, institutional, and commercial/industrial, which are generally associated with the nearby communities.

Alexander Valley

The Alexander Valley is a south-southwest trending valley between the Outer Coast Range to the west and Mayacamas Range to the east. The valley is approximately 20 miles in length and has a maximum width of 3.7 miles. It originates just above the confluence of the Russian River and Big Sulphur Creek, approximately 1.5 miles south of the Sonoma-Mendocino County line, and terminates near the confluence of the Russian River and Brooks Creek approximately four miles east of the City of Healdsburg. The valley floor elevation ranges from about 330 feet, mean sea level (msl) in the north and 120 feet, msl in the south. The mountains and foothills surrounding the valley are generally below 1,000 feet, msl, in elevation.

The Alexander Valley subarea has a gross area of about 11,188 acres. There are approximately 6,647 irrigated acres in the area, of which about 6,624 acres are in vineyard and 23 acres are in orchard. Lands identified as pasture (1,254 acres) are assumed to be non-irrigated.

Dry Creek Valley

The Dry Creek Valley is located west of the Alexander Valley and extends approximately 12 miles from Warm Springs Dam/Lake Sonoma in the north to the confluence of Dry Creek with the Russian River approximately one mile south of Healdsburg. The maximum width of the valley is about 0.75-mile. The valley floor elevation varies from 250 feet, msl in the upper valley to 90 feet, msl at the Russian River. The surrounding foothills and mountains of the Outer Coast Range exceed 1,000 feet, msl in elevation.

The Dry Creek Valley has a gross area of about 13,664 acres. There are approximately 6,097 irrigated acres in the area, of which about 5,090 acres are in vineyard and 188 acres are in orchard. Lands identified as pasture (199 acres) are assumed to be non-irrigated.

Northern Alexander Valley

The Northern Alexander Valley subarea is located north of Alexander Valley. This subarea has a gross area of about 7,777 acres. There are approximately 4,266 irrigated acres in the area, of which about 4,219 acres are vineyard and 47 acres are in orchard. Lands identified as pasture (540 acres) are assumed to be non-irrigated.

Russian River Valley

The Russian River Valley subarea is located south of the City of Healdsburg, and is the furthest of the valleys downstream on the Russian River. The subarea has a gross area of about 14,581 acres. There are approximately 4,506 irrigated acres, of which 4,483 acres are in vineyard and the remaining 23 acres are in orchard. Lands identified as pasture (1,688 acres) are assumed to be non-irrigated.

Water Sources for Current Land Uses

Current sources of water within the NSCARP area consist of the following:

- Natural stream flow in the Russian River, Dry Creek, and numerous smaller tributary streams;
- Natural runoff storage in Lake Mendocino and Lake Sonoma during the wet season and released in the dry season for rediversion at downstream points. Included in this source is water diverted by PG&E through its Potter Valley Project hydroelectric facilities that is stored in, and regulated by, Lake Mendocino; and,
- Groundwater within the Russian River, Alexander, and Dry Creek valleys.

The contribution from each of these sources has not been quantified as part of this report; however, these sources are presently utilized by various municipal, industrial, and agricultural users to meet their respective demands.

Potential Sources of Recycled Water

Recycled water for NSCARP is potentially available from six regional wastewater treatment plants located within the NSCARP area. These are: (1) the City; (2) ALWSZ; (3) Town; (4) City of Healdsburg; (5) City of Cloverdale; and, (6) the Geyserville Sanitation Zone. The locations of these wastewater treatment plants are shown in Figure 2-2. Of these potential providers, representatives from the City, ALWSZ, and the Town have participated in the planning and development of NSCARP, and have acknowledged that they could be potential recycled water providers for the project.

Treatment Process Associated with Recycled Water Sources

Wastewater goes through primary, secondary, and/or advanced tertiary treatment at wastewater treatment plants. Primary and secondary treatment removes approximately 95-98 percent of the solids and organic material. Tertiary treatment provides an additional filtration step to remove solids and organic material. The final step in the treatment process is the disinfection process, which destroys bacteria, viruses, and other pathogens (SCWA, 2004).

The City, ALWSZ, and the Town all operate tertiary (advanced) treatment plants. Tertiary treatment is the highest level of treatment as specified by state health guidelines for recycled water. The cities of Cloverdale and Healdsburg and the Geyserville Sanitation Zone currently operate secondary treatment facilities. The California Department of Health Services establishes water quality standards and treatment reliability criteria under Title 22, Chapter 4, of the California Code of Regulations.

Total Available Supply of Recycled Water to NSCARP

Immediate Supply

The total supply of recycled water that presently could be made available to NSCARP is approximately 7,234 af annually. This amount is based on 2004 influent (inflow into the relevant treatment plants) and takes into consideration the existing commitments for the City, Town, and the ALWSZ. The amount presently available from each provider is discussed below.

Future Supply

It is projected that by the year 2020, from population growth within their respective service areas, the City, the ALWSZ, and Town will have approximately 8,500 af annually of additional recycled water that will require a disposal alternative. NSCARP is a potential means for storage and delivery of approximately 13,000 af of recycled water annually.

Regulatory Requirements

Currently, the City and the Town discharge recycled water to the Russian River and/or its tributaries during the winter months. The U.S. Environmental Protection Agency (USEPA) issued new Water Quality Standards in 2000 to be applied to waters in the State of California to protect human health and the environment.

Dischargers who seek new or revised National Pollution Discharge Elimination System (NPDES) permits will be subject to the new Water Quality Standards, which could result in a reduction of treated water being discharged to the Russian River. A required reduction in discharge to the Russian River or its tributaries will require dischargers to develop other disposal alternatives.

Potential Users of Recycled Water

Presently, the City, the ALWSZ, and the Town all provide recycled water to lands within North Sonoma County for urban, industrial, and agricultural uses. It is expected that these entities will expand their use of recycled water in the future based on population growth, changes in existing land uses and crop demand, as well as regulatory requirements. Furthermore, when other potential providers upgrade their treatment level to tertiary, additional recycled water will be available in the region. Existing and potential future uses of recycled water are discussed below:

Agricultural

In 2003, lands irrigated with recycled water provided by the City, ALWSZ, and Town totaled some 8,638 acres (City of Santa Rosa, 2004). According to the California Department of Health Services (CDHS), water treated to tertiary level can be used to irrigate all food crops, even where such water contacts the edible portion of the crop (California Department of Health Services, 2004). NSCARP assumes that 21,500 acres of agricultural lands (existing vineyard and orchard) within the four geographical subareas of the NSCARP area could use recycled water for agricultural purposes. These lands were selected to maximize the use of recycled water and reduce reliance on natural regional water supplies. Frost protection use was not included in calculating the demand numbers for recycled water use because the demands from year to year for frost protection are variable and inconsistent; however, frost protection is an allowable use of recycled water that could occur as part of NSCARP.

Two local groups composed of vineyard growers and wineries - the Coalition for Sustainable Agriculture (CSA) and the Dry Creek Agricultural Water Users Corporation (DCAWU) - have expressed interest in participating in a recycled water project to develop alternative sources of water for agricultural requirements. These groups represent about 11,000 acres within the NSCARP area. The CSA has made multiple public presentations to regulatory agencies and urban providers regarding its efforts to promote the use of recycled water for agricultural purposes.

Urban

The City and the Town both promote urban reuse and provide recycled water for that purpose, including irrigation of parks, golf courses, commercial landscaping, and residential lawn and gardens. In its March 2003 IRWP EIR, the City estimates that its potential urban demand could be as much as 6,100 af annually. However, additional conveyance and storage facilities would be needed to meet the potential demand.

Industrial

The City currently pumps a portion of its recycled water through its Geysers Pipeline to the Geysers Steamfields for injection in the ground for energy production. Increasing the amount of water conveyed to the Steamfields has been identified as an alternative in the City's IRWP EIR.

Gravel processing along the Russian River was also identified as an alternative industrial reuse opportunity in the IRWP EIR.

Environmental

Potential environmental use of recycled water includes wetland habitat restoration or creation, and supplementing instream flows. No large scale environmental uses have been implemented by any of the potential water supply providers at this time. In its IRWP EIR, the City concluded that use of recycled water on wetlands could not reliably meet the discharge requirements for the constituents regulated under the California Toxics Rule. Instream use of recycled water in the summer months would require changes in the North Coast Regional Water Quality Control Board (NCRWQCB) Basin Plan.

Storage in Lake Sonoma

Lake Sonoma is an onstream reservoir that provides municipal water for SCWA. Discharge of recycled water to Lake Sonoma was identified as an alternative in the City's IRWP EIR. Although discharge to Lake Sonoma was identified as an alternative, it was screened from further analysis, and was not evaluated in the City's IRWP EIR. Multiple approvals from regulatory agencies would be required for such reuse.

2.2 PROJECT ALTERNATIVES

CEQA/NEPA Requirements

CEQA and NEPA generally require consideration of a range of alternatives to a proposed project that would feasibly attain most of the basic project objectives and accomplish the project purpose and need, while avoiding or substantially lessening project impacts. The purpose of alternatives is to offer a reasonable choice in making the decision whether to proceed with the project or action. Alternatives may include on-site and/or off-site alternatives. The CEQA/NEPA analysis must also include an analysis of the no-project or no-action alternative.

CEQA requires that the lead agency consider alternatives that would avoid or reduce one or more of the significant impacts identified for the project in an EIR. The CEQA Guidelines state that the range of alternatives required to evaluate in an EIR is governed by the "rule of reason": the EIR needs to describe and evaluate only those alternatives necessary to permit a reasoned choice and to foster informed decision-making and informed public participation (Section 15126.6[f]). Consideration of alternatives focuses on those that can either eliminate significant adverse environmental impacts or reduce them to less-than-significant levels. Alternatives considered in this context may include those that are more costly and those that could impede to some degree the attainment of all the project objectives (Section 15126.6[b]). CEQA does not require the alternatives to be evaluated at the same level of detail as the proposed project.

Similarly, the Council of Environmental Quality regulations for implementing NEPA (40 CFR 1502.14) require all reasonable alternatives to be objectively evaluated in an EIS. Alternatives that cannot reasonably meet project objectives need be evaluated only to the extent necessary to allow a complete and objective evaluation and a fully informed decision by the lead agency. An EIS must briefly describe alternatives to the proposed action where there exist unresolved resource conflicts. NEPA does not require alternatives to offer some environmental benefit over the proposed action; however, neither does it discourage consideration of alternatives with lesser effects. NEPA requires that alternatives be evaluated in the same level of detail (40 CFR 1502.14[b]).

Basis for Alternatives

The SCWA used five criteria to screen potential alternatives and carry forward for further study:

1. Potential offset of surface and groundwater sources currently used by agricultural entities in the Russian River, Alexander, and Dry Creek valleys.

2. Proximity of potential storage reservoirs to main water supply pipelines and substantial irrigated acreage;

3. Reasonable reservoir capacity to take advantage of economies of scale for development and to provide winter storage options to wastewater dischargers;

4. Willingness of landowners to participate in development of storage facilities on their properties; and,

5. Willingness of nearby landowners to participate in a program that substitutes recycled water for natural water supplies for irrigation use.

Alternatives Eliminated from Further Consideration

Industrial Reuse

Under this alternative, recycled water would be provided for use by gravel processors in the Russian River area near the Geysers pipeline. The portions of their gravel processing operations for which recycled use is appropriate could include dust control and gravel washing. A new pipeline or pipelines from the existing Geysers Pipeline and one or more pump stations would be required to carry recycled water to the gravel processing sites. Gravel processing facilities are the only facilities within 1,000 feet of the Geysers pipeline that would use significant amounts of water in their operations. Use of recycled water by a gravel processing plant is not an end use and the disposal of washwater from the facility would still need to be permitted. Therefore, it has been determined that such reuse where recycled water is not evaporated or absorbed does not meet the project objectives. Thus, this alternative was eliminated from further analysis.

Subsurface Storage

Under this alternative, recycled water would be injected into the aquifer through a series of wells and pumps for storage until required for reuse or discharge. Water would then be extracted from the aquifer through the wells and distributed to the irrigation areas. Some additional treatment of recycled water would occur while traveling in the aquifer. Storage is needed for NSCARP and this alternative contributes to achieving the primary project objectives.

If suitable sites were identified, additional testing would be required to demonstrate reliable operations and permits would be required. Additional detailed groundwater and geotechnical modeling would be needed, followed by field testing. The first cycle of testing would use potable water, followed by a second cycle of testing using recycled water. Potential problems that could be encountered include insufficient capacity, well clogging, or migration of water outside of the identified area of impact.

Subsurface storage meets project objectives, but is currently not feasible. Given the regulatory uncertainties and potential problems that could be encountered, underground storage cannot be considered a reliable storage method at this time. Therefore, underground storage of recycled water is considered infeasible and has been eliminated from further study.

Use Storage Reservoirs to Store Stormwater Runoff

Under this alternative, storage reservoirs would be enlarged to accommodate stormwater runoff from adjacent hillsides or flat lands. This proposal does not provide wastewater recycling, and; therefore, was eliminated from further consideration.

Create Wetlands in Storage Reservoirs

Under this alternative, storage reservoirs would be built to include wetland habitat features. This would require the reservoirs to be constructed with shallow areas, as water depth generally greater than about five feet deep does not support high quality wetlands. Restricting the depth of all or part of each storage reservoir to a range that promotes wetland habitat values would either reduce their value as storage or substantially increase their size and resulting impacts. Therefore, this alternative was deemed infeasible and dismissed from further consideration.

Keep Reservoirs Full to Increase Habitat Value

Under this proposal, storage reservoirs would be operated to maintain them at full, or as nearly full as possible, to increase wetland habitat values. The purpose of the storage reservoirs is to store water during the winter for reuse during the summer, when demand for irrigation water is at its height. If reservoirs were kept full throughout the summer, the reservoirs would have little capacity to store recycled water during the winter months. Keeping reservoirs full would limit their use and decrease the reliability of the system. Therefore, this alternative is considered infeasible and has been eliminated from further study.

Alternative Reservoir Sites

Reservoir sites were evaluated in the four geographical subareas that have been identified as possible service areas for the distribution and use of recycled water. The general locations of the subareas are shown in Figure 2-2. The scope of evaluation varied on a site-by-site basis, depending upon the quality of site-specific mapping available. Where site-specific topographic mapping was insufficient, USGS 7.5-minute quadrangle maps were used. Reconnaissance-level geologic evaluations were performed for some of the sites, which included review of published geologic and seismic data, review of stereo-paired aerial photographs, and on-site observations. The on-site evaluations focused on field-checking potential geologic hazards, such as potentially active faults or landslides that could affect project feasibility.

In the Alexander Valley subarea, 21 reservoir sites were considered; five potential reservoir sites were evaluated in the Dry Creek Valley subarea; four in the Northern Alexander Valley subarea; and, 12 potential reservoir sites were considered in the Russian River Valley subarea. Of these, a total of 23 reservoir sites were subsequently eliminated for further consideration. A summary of each eliminated site and the primary reason for its elimination is provided in Table 2-3.

Table 2-3. Reservoir Sites Eliminated from Further Consideration

Reservoir Name APN	APN	Storage Amount (af)	Water Surface Elevation (feet above msl)	Reasons for Elimination
Alexander Valley				
Walker Summer Trust, JVW Corp. - Walker Site	092-030-31,36	3,000	385	Owner opposed to use of this site
Castaneda	091-080-01	400	191	High groundwater and flood plain concerns
Kendall-Jackson -Lytton Station		380	188	High groundwater and flood plain concerns
Stonestreet	131-110-07	440	230	Withdrawn at owner's request
Estancia - Flat Land Site	131-160-02	165	216	Withdrawn at owner's request, vineyard impacts, releases require pumping
Hoot Owl - Ridge Ranch	132-160-027,029	249	506	Mayacama Fault runs through site
Dry Creek Rancheria - Site A	131-040-01,08,09,18,19; 131-050-04	1,600	320	Major diversion of natural inflow required
Kendall-Jackson, Alexander Mountain Estate				
Site #5	131-120-02	380	978	Withdrawn at owner's request
Site #6	131-120-02	2,300	795	"

Table 2-3. Reservoir Sites Eliminated from Further Consideration (Continued)

Reservoir Name APN	APN	Storage Amount (af)	Water Surface Elevation (feet above msl)	Reasons for Elimination
Kendall-Jackson, Alexander Mountain Estate				
Site #7	131-120-11	210	530	"
Site #8	131-120-02	815	770	"
Robert Young Vineyards				
Squibb (existing)	131-110-004	N/A	N/A	Large drainage area, geologic instability, property boundary constraints
Warner (existing)	131-110-002	N/A	N/A	"
Goodman (existing)	131-070-017	N/A	N/A	Topographically unsuitable for significant enlargement
City - Bear Canyon	131-150-29	N/A	N/A	Topographically unsuitable for large reservoir, large tributary drainage area
Dry Creek Valley				
Passalacqua #1 110-150-001, 019& 020		1,520	271	Significant amount of existing vineyard would need to be removed
Passalacqua & others - Passalacqua #2	110-150-019 +	350	195	Inefficient site for earthwork
Russian River Valley				
Palmer	110-190-004, 5	3,300	280	Owner opposed to use of this site, possible Quaternary fault through site
Becnel -Existing Enlarged	110-180-39	1,430	435	Owner opposed to use of this site
Vino Farms, Inc. - Ranch 8	066-310-28	900	175	Withdrawn at owner's request
Becnel/Martin	110-180-26	800	500	Topographically inefficient site, high cost
Gallo - Twin Valley Existing Enlargement	110-200-002	386	345	Boundary constraints, unbalanced earthwork
Gallo -Twin Valley (Denner Ranch)	110-200-004	1,335	220	Withdrawn at owner's request, requires removal of existing vineyard

Alternatives Considered and Carried Forward for Analysis (Project Alternatives)

The NSCARP area encompasses the largest concentration of agricultural lands within Sonoma County. The potential irrigation demand associated with serviceable lands in three of the four subareas exceeds the proposed reservoir storage capacity and dry-season recycled water supplies identified to date. Therefore, in addition to an alternative involving NSCARP in its entirety, two *subset* alternatives of NSCARP were selected as project alternatives as they met the alternative selection criteria, as well as the larger project objective of irrigating the maximum amount of existing acreage with the estimated storage capacity identified within the subarea. The project alternatives include the following:

- Alternative 1: No Action
- Alternative 2 (Preferred Alternative): Entire North Sonoma County Agricultural Reuse Project
- Alternative 3: Alexander Valley-Jordan Reservoir Subset
- Alternative 4: Russian River Valley-Westside Subset

Alternatives 1, 3, and 4 are presented in Sections 2.2.2, 2.2.3, and 2.2.4 respectively.

Preferred Alternative

SCWA and Reclamation have identified Alternative 2 as the preferred alterative. The selection was made based on Alternative 2's ability to fully meet the project purpose and objectives, engineering feasibility, minimization of environmental impacts, and input received during the public scoping process. Additionally, the selection of Alternative 2 as the preferred alternative is based on the conclusions of the impact analysis presented in Chapter 3.

Environmentally Superior Alternative

Alternative 2 is environmentally superior. There are many similarities between the environmental impacts associated with Alternatives 2 through 4. Alternatives 3 and 4 would have less construction impacts than Alternative 2 because of the reduced project area and the fewer number of proposed facilities. However, Alternative 2 is preferred because it provides the greatest potential for meeting the project's purposes and objectives to improve habitat for listed fish species.

With Alternative 2, there would be the greatest offset of surface water use; therefore, the largest increase in summer flows in the tributaries of the Russian River. In addition, because the reduction in agricultural diversions from the Russian River would help maintain storage levels in Lake Mendocino, Alternative 2 would result in the most water being available that can be released in the fall to assist with Chinook salmon upstream migration.

Although the No Action Alternative would cause fewer direct environmental impacts, it would not meet the purpose and need or objectives of the proposed project.

2.2.1 Alternative 2 (Preferred Alternative) – Entire NSCARP

Implementation of Alternative 2 – Entire NSCARP consists of the following new components, which are highlighted in Table 2-4 and described in detail in the alternatives:

- Approximately 21,500 acres of presently developed agricultural lands within the Russian River, Alexander, and Dry Creek valleys;
- Nineteen recycled water storage reservoirs totaling about 11,200 af in storage capacity;
- Approximately 112 miles of transmission pipeline;
- Eight booster and nine distribution pumping stations;
- Approximately 7,234 af of recycled water that could presently be made available from the City, the Town, and the ALWSZ; and,
- A projected future available supply of recycled water of 21,134 af.

Table 2-4. Alternative 2 Project Components

Subarea	Project Component	Project Alternatives		
		2	3	4
Alexander Valley				
	Jordan A Reservoir	X	X	
	Jordan C Reservoir	X	X	
	Lytton - Existing Reservoir	X		
	Lytton - Enlargement Reservoir	X		
	Robert Young - Enlargement Reservoir	X		
	T-Bar-T Existing - Enlargement Reservoir	X		
	T-Bar-T #1 Reservoir	X		
	Linear feet of pipeline	143,000	88,176	
	Crossing(s) of Russian River	1	1	
	Number of booster pumping stations	2	1	
	Number of distribution pumping stations	1		
	Acres of irrigated area	6,647	3,492	
Dry Creek Valley				
	Passalacqua #3 Reservoir	X		
	Kuimelis #1 Reservoir	X		
	Kuimelis #2 Reservoir	X		
	Approximately 167,000 linear feet of pipeline	167,000		
	Crossing(s) of Dry Creek	3		
	Number of booster pumping stations	2		
	Number of distribution pumping stations	2		
	Acres of irrigated area	6,097		

Table 2-4. Alternative 2 Project Components (Continued)

Subarea	Project Component	Project Alternatives		
		2	3	4
Russian River Valley				
	Russell-Bucher Reservoir	X		X
	Bucher Reservoir	X		X
	Becnel #2 Reservoir	X		X
	J Wine Reservoir	X		
	Gallo Twin Valley Existing Reservoir	X		X
	Denner Ranch #2 Reservoir	X		
	Linear feet of pipeline	142,000		58,608
	Crossings of the Russian River	2		1
	Crossing(s) of Mark West Creek	5		
	Number of booster pumping stations	1		1
	Number of distribution pumping stations	4		2
	Acres of irrigated area	4,506		2,115
Northern Alexander Valley				
	Bilbro-Biocca Reservoir	X		
	Todd Reservoir	X		
	Klein Foods Reservoir	X		
	Gallo Asti -Existing Reservoir	X		
	Linear feet of pipeline	142,000		
	Crossings of the Russian River	2		
	Number of booster pumping stations	3		
	Number of distribution pumping stations	2		
	Acres of irrigated area	4,266		
Totals				
Total combined reservoir storage capacity (af)		11,229	**1,821**	**1,145**
Total linear feet of distribution pipeline		594,000	**88,176**	**58,608**
Total available water supply (af)		7,234	**2,239**	**1,563**
Total acreage served		21,516	**3,492**	**2,115**
Total Estimated Project Cost (in millions)		$385.3	**$49.9**	**$30.5**

NSCARP of encompasses the heart of the Sonoma County wine grape region. Approximately 21,500 acres of vineyards and orchards exist within the area; all are presently irrigated by: (1) direct diversion from regional rivers and streams; (2) withdrawals of stored water diverted into reservoirs from regional watercourses; or, (3) groundwater extractions. The irrigation season typically runs from June through October. For direct diversion in particular, this is the season when natural flows in the watercourses are at their lowest. Supplementing or replacing these diversions with recycled water provides an opportunity for better management of regional water resources.

The availability of recycled water is greatest during the wet season (December through March). Because there is little to no irrigation demand during this period, storage reservoirs would be needed to retain recycled water generated in the winter months for use as irrigation supply in the summer months. This alternative involves the development of 19 recycled water storage reservoirs totaling about 11,200 af in storage capacity. In addition, about 112 miles of large-diameter transmission pipeline and numerous pumping stations for conveying water from the source of recycled water (primarily the City's Geysers Pipeline) to the storage reservoirs, and for distribution of the stored water from the reservoirs to agricultural lands is proposed.

A summary of project costs for storage reservoir construction is provided on a subarea basis in Table 2-5. The estimated costs include all earthwork, low-level outlet conduits, erosion control measures, distribution pump stations and contractor's mobilization. Not included in the estimated construction costs are right-of-way acquisition and electrical supply (if required). Also not included are the supply pipelines and booster pumping stations required to fill some of the reservoirs. Estimated project costs for each subarea for construction of the transmission pipeline system, as well as pump stations required for filling reservoirs[1] is shown in Table 2-6.

Table 2-5. Estimated Project Costs of Reservoirs

Subarea	Project Component	Estimated Subarea Project Cost (millions)	Storage Capacity (af)	Unit Cost (per af of storage)	Capitalized Project Cost
Alexander Valley Floor					
	Jordan A	$ 9.0	1,104	$ 8,200	$ 653,400
	Jordan C	4.9	717	6,800	355,700
	Lytton - Existing	3.6	410	8,780	261,000
	Lytton - Enlargement	10.1	1,763	5,740	733,000
	Robert Young - Enlargement	8.0	340	23,500	580,800
	T-Bar-T Existing - Enlargement	9.1	359	25,300	660,700
	T-Bar-T #1	6.4	332	19,300	464,600
Subtotal (w/ exist. Lytton)		**$ 41.0**	**3,262**		**$ 2,976,200**
Subtotal (w/ enlarged Lytton)		**$ 47.5**	**4,615**		**$ 3,448,200**
Dry Creek Valley					
	Passalacqua #3	$ 5.5	714	$ 7,700	$ 399,000
	Kuimelis #1	5.7	785	7,300	417,000
	Kuimelis #2	6.1	623	9,900	445,000
Subtotal		**$ 17.3**	**2,122**		**$ 1,261,000**
Russian River Valley					

Table 2-5. Estimated Project Costs of Reservoirs (Continued)

[1] Estimated costs for pumping stations required for distribution of recycled water for irrigation are included in the project cost estimates for reservoir construction.

Subarea	Project Component	Estimated Subarea Project Cost (millions)	Storage Capacity (af)	Unit Cost (per af of storage)	Capitalized Project Cost
	Russell-Bucher	$ 3.0	361	$ 8,300	$ 216,300
	Bucher	2.0	239	8,300	144,500
	Becnel #2	6.6	312	21,200	480,000
	J Wine	2.4	250	9,400	174,200
	Gallo Twin Valley	0.4	250	1,500	27,800
	Denner Ranch #2	2.0	100	19,500	141,500
Subtotal		**$ 16.4**	**1,512**		**$ 1,184,300**
Northern Alexander Valley					
	Bilbro-Biocca	$ 12.2	1,848	$ 6,600	$ 887,000
	Todd	5.6	300	18,600	406,000
	Klein Foods	7.1	447	14,800	515,000
	Gallo Asti -Existing	1.6	385	4,160	116,000
Subtotal		**$ 26.5**	**2,980**		**$ 1,924,000**
Project Total (w/ enlarged Lytton)		**$107.7**	**11,229**		**$ 7,806,700**
Capitalized Unit Storage Cost:		**$696 / acre-foot**			

Table 2-6. Estimated Project Costs for Transmission Pipeline System

Subarea	Irrigated Area (acres)	Project Cost (millions)	Capitalized Cost	
			(millions/year)	(per acre)
Alexander Valley Floor	6,647	63.3	4.6	690
Dry Creek Valley	6,097	77.6	5.6	920
Northern Alexander Valley	4,266	75.9	5.5	1,290
Russian River Valley	4,506	60.8	4.4	980
Total	21,516	$277.6	$20.0	$940

A contingency factor of 25 percent has been added to the estimated construction costs. Design, permitting, and construction costs are estimated to be 25 to 30 percent of the sum of the estimated construction cost plus contingency. Capitalized costs were estimated assuming an interest rate of six percent over a 30-year term.

The proposed pipeline alignments are generally along paved rights-of-way, although in several locations the alignments are on privately owned parcels. Alignments crossing private lands are generally along property boundaries.

Alexander Valley Subarea

Alexander Valley Reservoir Sites

Six reservoirs are proposed in this subarea (Jordan A, Jordan C, the existing Lytton Reservoir [possible enlargement], Robert Young, T-Bar-T existing, and T-Bar #1), for a total potential storage capacity of 4,600 af (see Figure 2-3). A summary of each site is included in Table 2-7.

Jordan Reservoirs "A" and "C"

The two proposed reservoirs are situated about three miles northeast of Healdsburg in the hills on the west side of the Russian River on small unnamed intermittent tributaries. Both reservoirs would be impounded by zoned earth embankment dams, with earth materials for dam construction expected to be obtainable from within the respective reservoir areas. Affected areas of vineyard impacted by construction of the Jordan A and Jordan C reservoirs would be approximately 1.6 acres and 2.6 acres, respectively.

Table 2-7. Alexander Valley Reservoir Sites

Parameter	Jordan A	Jordan C	Lytton		Robert Young	T-Bat T Existing	T-Bar-T #1
			Existing	Enlarged			
Storage Capacity (af)	1,104	717	410	1,763	340	359	332
High water elevation	453	465	200	240	316	386	420
Maximum water depth (ft)	80	65	28	60	56	45	54
Dam height (ft)[2]	98	77	34	60	66	93	120
Embankment volume (cy)[3]	446,000	245,000	21,000	358,000	374,000	458,100	312,000

2 Dam height measured as a vertical difference between lowest elevation of downstream embankment toe and maximum storage elevation.
3 Excludes foundation earthwork.

Lytton Reservoir

The Lytton Reservoir is an existing facility that is under the jurisdiction of the California Department of Water Resources, Division of Safety of Dams (DOSD). It is located west of U.S. 101 and about 2,500 feet south of Lytton Springs Road. The present capacity of the reservoir is about 410 af per DOSD records (DWR 2000). Two earth embankment dams on the north and south sides impound the reservoir (20 feet and 34 feet tall, respectively). A 12-inch diameter outlet conduit passes through the base of the Upper Dam located at the north end. The reservoir area at the maximum storage elevation is about 31 acres. The storage capacity of the reservoir would be increased to about 1,760 af by a 40-foot raise of the existing dams. The estimated footprint of the enlarged reservoir would cover an estimated 46 acres of land. It is anticipated, but must be confirmed, that soil and rock materials on site would be adequate in both quantity and strength for dam construction.

Figure 2-3. Alexander Valley Location Map

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Robert Young Existing Home Ranch Reservoir Enlargement

This reservoir is located near the intersection of Red Winery Road and Geysers Road on APN 131-00-023. The existing reservoir is off-stream and formed by a main embankment dam approximately 15 feet high on the southwesterly side, and a six-foot high dike-type dam on the northeasterly side. The existing reservoir capacity would be expanded by construction of two large L-shaped embankments at the southwesterly and northeasterly sides of the site.

Approximately four acres of vineyard would be affected and an existing overhead power transmission line would need to be rerouted. It is anticipated that there would be insufficient earth materials available within the reservoir area for dam construction. Potential sources include two hilltops upslope from the reservoir.

T-Bar-T Existing Reservoir Enlargement

This reservoir is located about one mile northwest of the intersection of Red Winery Road and Geysers Road. A small agricultural reservoir of unknown capacity exists at the site. The reservoir is impounded by an L-shaped embankment dam, approximately 28 feet high, and is situated on a small unnamed tributary to Gird Creek. A much larger L-shaped dam downslope of the existing dam would be constructed, along with a new saddle dam on the westerly side of site. Approximately eight acres of vineyard, along with several buildings at the existing ranch compound, would be affected. It is anticipated that there is sufficient earth materials within the reservoir area for dam construction, if they meet classification and strength requirements.

T-Bar-T #1 Reservoir Enlargement

This reservoir is located about 2,000 feet west of the aforementioned T-Bar-T Existing Reservoir, and on the same parcel. The site is a topographic divide between the main stem Russian River watershed and the Gird Creek watershed. Two relatively large embankment dams within topographic swales on the east and west sides of the site would be constructed. It is anticipated that there is sufficient earth materials within the reservoir area for dam construction, if they meet classification and strength requirements.

Alexander Valley Transmission Pipeline Alignments

The transmission pipeline system for the Alexander Valley subarea is shown on Figure 2-3. The system would involve the following:

- Installation of about 143,000 linear feet of large diameter transmission pipeline
- One crossing of the Russian River; and,
- Two booster pumping stations for filling the proposed reservoirs and one distribution pumping station:

- o Booster: Jordan (500 hp) and T Bar T (40 hp)
- o Distribution: Lytton (1,150 hp)

The system would be connected to the Geysers Pipeline at the following locations: (1) Node 45 near the intersection of Lytton Station Road and Alexander Valley Road; (2) Node 1 near the intersection of Alexander Valley Road and West Soda Rock Lane, just west of the Russian River; and, (3) Node 18 near the intersections of Alexander Valley Road and State Highway 128. The proposed alignments are generally along paved rights-of-way, although in several locations the alignments are on privately owned parcels.

A 36-inch diameter primary main line network would be required along portions of Alexander Valley Road, Lytton Station Road, and Highway 128. Branching "dead-end" pipelines have been sized at 30- to 12-inch diameter depending on the number of acres served. It is anticipated that pipelines larger than 24-inch diameter would be concrete cylinder pipe, and pipelines 24-inch diameter and smaller would be American Water Works Association (AWWA) C900 or C905 PVC pipeline. With a few exceptions, it has been conservatively assumed that the minimum pipe size would be 18-inch diameter, regardless of the acreage to be served at the terminal ends of branching pipelines. This assumption is intended to offset to some degree the fact that the present level of analysis does not include smaller laterals that would be required to reach parcels not abutting a public right-of-way. It also allows for possible extension of these pipelines to parcels beyond the present service area.

Dry Creek Valley Subarea

Dry Creek Valley Reservoir Sites

In the Dry Creek Valley subarea, three reservoir sites (Passalacqua #3, Kuimelis #1, and Kuimelis #2), totaling about 2,100 af in potential storage capacity, are proposed (see Figure 2-4). A summary of each site is shown in Table 2-8.

Table 2-8. Dry Creek Valley Reservoir Sites

Parameter	Passalacqua #3	Kuimelis #1	Kuimelis #2
Storage Capacity (af)	714	785	623
High water elevation	231	395	595
Maximum water depth (ft)	64	95	90
Dam height (ft)	85	115	95
Embankment volume (cy)	160,000	170,000	279,000

Figure 2-4. Dry Creek Valley Location Map

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Passalacqua #3 Reservoir

The Passalacqua #3 site is located in the low hills immediately southeast of the intersection of Westside Road and Mill Creek Road, about one mile southwest of Healdsburg. The site is an unnamed intermittent tributary of the Russian River. A zoned earth embankment dam would impound the reservoir. Reservoir construction would affect about 15 acres of existing vineyard. It is anticipated that there is sufficient earth materials within the reservoir area for dam construction if they meet classification and strength requirements.

Kuimelis #1 Reservoir

The Kuimelis #1 Reservoir site is located in the hills west of the Russian River near the confluence of Wallace Creek and Mill Creek, about 2.4 miles southwest of Healdsburg. The site is on an unnamed intermittent tributary of Wallace Creek immediately upstream of its confluence with Mill Creek. Mill Creek ultimately flows into Dry Creek, thence the Russian River. A zoned earth embankment dam would impound the reservoir, with earth materials for dam construction expected to be obtainable from within the reservoir area.

Kuimelis #2 Reservoir

The Kuimelis #2 Reservoir site is located in the hills west of Dry Creek Road and about two miles west of Healdsburg. The site is located near the upper end of an unnamed intermittent tributary to Dry Creek. An existing agricultural reservoir is located on the subject tributary about 0.7-mile downstream. A zoned earth embankment dam would impound the reservoir. Given the apparent steep natural slopes within the proposed reservoir, it appears likely that some or all of the required dam materials would need to be excavated from areas outside of the reservoir area.

Dry Creek Valley Transmission Pipeline Alignments

The transmission pipeline system for the Dry Creek Valley subarea is shown on Figure 2-4. The system would involve the following:

- Installation of about 167,000 linear feet of large diameter transmission pipeline
- Three crossings of Dry Creek; and,
- Two booster pumping stations for filling the Kuimelis reservoirs and two distribution pumping stations:
    - Booster: Kuimelis #1 (270 hp) and Kuimelis #2 (400 hp)
    - Distribution: Kuimelis #1 (560 hp) and Passalacqua #3 (560 hp)

The alignments include supply pipelines from the Geysers Pipeline to the proposed Passalacqua #3 Reservoir, and the Kuimelis #1 and #2 reservoirs, as well as distribution pipelines from these reservoirs to the service area. The proposed alignments are generally along paved rights-of-way, although in several locations the alignments are on privately owned parcels.

A 36-inch diameter primary main line network would be required following Dry Creek Road from the Geysers Pipeline turnout to Yoakim Bridge Road. Secondary pipelines over the crossings of Dry Creek and along West Side Road, as well as branching "dead-end" pipelines, have been sized at 18- to 30-inch diameter depending upon the number of acres served. It is anticipated that pipelines larger than 24-inch diameter would be concrete cylinder pipe, and pipelines 24-inch diameter and smaller would be AWWA C900 or C905 PVC pipeline. With a few exceptions, it has been conservatively assumed that the minimum pipe size would be 18-inch diameter, regardless of the acreage to be served at the terminal ends of branching pipelines.

This assumption is intended to offset, to some degree, the fact that the present level of analysis does not include smaller laterals that would be required to reach parcels not abutting a public right-of-way. It also allows for possible extension of these pipelines to parcels beyond the present service area.

Northern Alexander Valley Subarea

Northern Alexander Valley Reservoir Sites

In the Northern Alexander Valley subarea, four reservoir sites (Bilbro-Biocca, Todd, Klein Foods, and Gallo Asti [existing]), totaling about 2,980 af in potential storage capacity, are proposed (see Figure 2-5). A summary of each site is shown in Table 2-9.

Table 2-9. Northern Alexander Valley Reservoir Sites

Parameter	Bilbro-Biocca	Todd	Klein Foods	Gallo Asti (Existing)
Storage Capacity (af)	1,848	300	447	385
High water elevation	388	500	452	340.7
Maximum water depth (ft)	112	50	62	40
Dam height (ft)	143	100	87	34
Embankment volume (cy)	563,000	265,000	247,000	N/A

Figure 2-5. Northern Alexander Valley Location Map

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Bilbro-Biocca Reservoir

The Bilbro-Biocca Reservoir site is located in the hills west of Highway 101 and about 1.4 miles north of Geyserville. The site is on an unnamed intermittent tributary of the Russian River. East of Highway 101, the stream has been converted to a manmade channel through a vineyard. A zoned earth embankment dam would impound the reservoir. Reservoir construction would impact about 15 acres of existing vineyard on the Bilbro property. It is anticipated that there is sufficient earth materials within the reservoir area for dam construction, if they meet classification and strength requirements.

Todd Reservoir

The Todd Reservoir site is located in the hills east of River Road and Highway 101 and about 1.9 miles north of Geyserville. The site is on an unnamed intermittent tributary of the Russian River. West of River Road, the stream has been converted to a manmade channel through a vineyard. There is a small dam and pond existing on the site, with a reported capacity of 24 af (Ken Todd, pers. comm., 2000). It is anticipated that there would be insufficient earth materials available within the reservoir area for dam construction.

Klein Foods Reservoir

The Klein Foods Reservoir site is located in the hills east of River Road and about 1.3 miles north of Asti. The site is on an unnamed tributary of the Russian River. The reservoir would be impounded by a zoned earth embankment dam, with earth materials for dam construction expected to be obtainable from within the reservoir area. Reservoir construction would impact about 14 acres of existing vineyard. A small reservoir exists in the next small drainage immediately north of the site. It is anticipated that there is sufficient earth materials within the reservoir area for dam construction, if they meet classification and strength requirements.

Gallo Asti Reservoir (Existing)

This is an existing facility that was originally constructed in 1955 and enlarged in the early 1990s. It is located in the hills west of Highway 101. The reservoir is impounded by an embankment dam. An 18-inch diameter outlet conduit was constructed through the embankment foundation. The capacity of the reservoir is about 383 af. An enlargement of the reservoir is not proposed. Use of this reservoir to store recycled water would require major diversion of natural inflow. It is estimated that over 3,500 linear-feet of large diameter corrugated polyethylene pipe would be required to isolate the reservoir from its tributary drainage area.

Northern Alexander Valley Transmission Pipeline Alignments

The transmission pipeline system for the Northern Alexander Valley subarea is shown on Figure 2-5. The system would involve the following:

- Installation of about 142,000 linear feet of large diameter transmission pipeline
- Two crossings of the Russian River; and,
- Three booster pumping stations for filling the proposed reservoirs and two distribution pumping stations:
    - Booster: Bilbro-Biocca (130 hp), Klein Foods (200 hp), and Todd (120 hp)
    - Distribution: Gallo Asti (400 hp) Klein Foods (450 hp)

The alignments include supply pipelines from the Geysers Pipeline to the proposed Bilbro-Biocca, Todd, and Klein Foods reservoirs, to the existing Gallo Asti Reservoir, and the distribution pipelines from these reservoirs to the service area. The proposed alignments are generally along paved rights-of-way, although in several locations the alignments are on privately owned parcels.

A 30-inch diameter primary main line network would be required. Branching "dead-end" pipelines have been sized at 24- to 18-inch diameter depending on the number of acres served. It is anticipated that pipelines larger than 24-inch diameter would be concrete cylinder pipe, and pipelines 24-inch diameter and smaller would be AWWA C900 or C905 PVC pipeline. With a few exceptions, it has been conservatively assumed that the minimum pipe size would be 18-inch diameter, regardless of the acreage to be served at the terminal ends of branching pipelines. This assumption is intended to offset to some degree the fact that the present level of analysis does not include smaller laterals that would be required to reach parcels not abutting a public right-of-way. It also allows for possible extension of these pipelines to parcels beyond the present service area.

Russian River Valley Subarea

Russian River Valley Reservoir Sites

In the Russian River Valley subarea, six reservoir sites (Russell-Bucher, Bucher, Becnel #2 [hereinafter referred to as the proposed West Side Sites/Reservoirs], J Wine, Gallo Twin Valley [existing]), and Denner Ranch #2, totaling about 1,500 af in potential storage capacity, are proposed (see Figure 2-6). A summary of each site is shown in Table 2-10.

<u>Russell-Bucher Reservoir</u>

The Russell-Bucher Reservoir site is located in the hills west of Westside Road on an unnamed intermittent tributary of the Russian River. The reservoir would be impounded by a zoned earth embankment dam, with earth materials for dam construction expected to be obtainable from within the reservoir area.

Figure 2-6. Russian River Valley Location Map

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Table 2-10. Russian River Valley Reservoir Sites

Parameter	West Side Sites/Reservoirs				J Wine	Denner Ranch #2
	Russell-Bucher	Bucher	Becnel #2	Gallo Twin Valley		
Storage Capacity (af)	361	239	312	250	250	100
High water elevation	370	300	475	345	176	96
Maximum water depth (ft)	65	70	90	40	48	31
Dam height (ft)	82	90	155	42	61	31
Embankment volume (cy)	96,000	85,000	310,000	N/A	88,000	60,000

Bucher Reservoir

The Bucher Reservoir site is located in the hills west of Westside Road on an unnamed intermittent tributary of the Russian River. The reservoir would be impounded by a zoned earth embankment dam. Steep natural slopes at the proposed reservoir area may limit the amount of earth materials that can be excavated from below the maximum storage elevation; thus, sources of dam materials outside of the reservoir may need to be used.

Becnel #2 Reservoir

The Becnel #2 Reservoir site is located in the hills west of Westside Road on an unnamed intermittent tributary of the Russian River, and within the same watershed as the proposed Bucher Reservoir. A zoned earth embankment dam would impound the reservoir. The existing slopes of the reservoir area are relatively steep in their natural condition, and it is anticipated that excavation to the extent required for dam construction would result in an unstable condition. Therefore, embankment materials would likely need to be obtained from outside the reservoir area. Adjacent areas may be recontoured for the dual purpose of generating dam materials and creating vineyard-suitable terrain.

J Wine Reservoir

The proposed dam and reservoir is located immediately northeast of the intersection of Eastside Road and Windsor River Road. The site is located at a drainage divide between two unnamed tributaries to the Russian River and Windsor Creek. Preliminary evaluation suggests that a reservoir with a capacity of about 250 af could be impounded by the construction of an embankment dam approximately 60 to 70 feet high across the southerly tributary, and assuming that all embankment materials available for dam construction are obtainable below the maximum storage elevation of the reservoir. A dike-type dam approximately 20 to 25 feet high would be required across a swale on the north side of the reservoir to achieve the estimated capacity.

Gallo Twin Valley Reservoir (Existing)

This is an existing facility that was constructed in 1997 and is located in the hills west of Westside Road. The present capacity of the reservoir is about 250 af. The trapezoidal-shaped reservoir is impounded on three sides by an embankment dam. The highest dam section is on the east side of the reservoir. On the downstream side of east dam, an agricultural fill was constructed at about 5:1 slope and has been planted to vineyard. A 24-inch diameter outlet conduit was constructed through the westerly embankment and is used to convey water for frost protection and irrigation of vineyard. No enlargement of this reservoir is proposed.

Denner Ranch #2 Reservoir

The proposed reservoir is located immediately west of the corner of Oakwild Drive and West Olivet Road. The site is located on an unnamed intermittent tributary of Mark West Creek. Preliminary evaluation suggests that a reservoir with a capacity of about 100 af could be constructed. The reservoir would be impounded on all sides by an embankment, with maximum embankment height of about 31 feet.

Russian River Valley Transmission Pipeline Alignments

The transmission pipeline system for the Russian River Valley subarea is shown on Figure 2-6. The system would involve the following:

- Installation of about 142,000 linear feet of large diameter transmission pipeline
- Two crossings of the Russian River and five crossings of Mark West Creek; and,
- One booster pumping station for filling two of the proposed reservoirs and five distribution pumping stations:
    - Booster: Bucher (1,000 hp)
    - Distribution: Gallo Twin Valley (150 hp), J-Wine (140 hp), Russell-Bucher (360 hp), and Denner Ranch #2 (220 hp)

The alignments include supply pipelines from the Geysers Pipeline to the proposed Russell-Bucher, Bucher, Becnel #2, J Wine, and Denner Ranch #2 reservoirs, and the existing Gallo Twin Valley Reservoir, as well as distribution pipelines from these reservoirs to the service area. The proposed Denner Ranch #2 Reservoir would also have the potential to be supplied directly by the ALWSZ through an existing network of treated effluent distribution pipelines. The proposed alignments are generally along paved rights-of-way, although in several locations the alignments are on privately owned parcels.

A 30-inch diameter primary main line network would be required along Westside Road, Eastside Road, and Old Redwood Highway (these main lines would be linked by the 26-inch diameter supply line off the Geysers Pipeline). Branching “dead-end” pipelines have been sized at 18- to

24-inch diameter depending on the number of acres served. It is anticipated that pipelines larger than 24-inch diameter would be concrete cylinder pipe, and pipelines 24-inch diameter and smaller would be AWWA C900 or C905 PVC pipeline. With a few exceptions, it has been conservatively assumed that the minimum pipe size would be 18-inch diameter, regardless of the acreage to be served at the terminal ends of branching pipelines. This assumption is intended to offset to some degree the fact that the present level of analysis does not include smaller laterals that would be required to reach parcels not abutting a public right-of-way. It also allows for possible extension of these pipelines to parcels beyond the present service area.

Booster and Distribution Pump Stations (all four subareas)

The proposed booster pump stations would provide sufficient water pressure to convey recycled water through applicable pipelines for filling the reservoirs. The booster pump stations would consist of pump motors, emergency generators, masonry buildings, connecting pipelines, and related equipment and would be housed in approximately 25- by 25-foot buildings. The structures would be approximately 20 feet in height.

The proposed distribution pump stations would pump recycled water from the new storage reservoirs through the recycled water distribution pipelines, for delivery to the recycled water to users. The distribution pumps stations would consist of pump motors, emergency generators, masonry buildings, connecting pipelines, and related equipment and would be housed in approximately 50- by 50-foot buildings. The structures would be approximately 20 feet in height.

Construction Considerations

Construction of Pipelines

Construction of the proposed recycled water pipelines would involve one of the four potential methods: (1) trenching; (2) jack and bore tunneling; (3) horizontal directional drilling; and, (4) suspending the pipe (applicable only in presence of a bridge). For the first three methods, the proposed recycled water pipelines would be installed beneath the ground surface or underneath existing roads, while in the fourth method the proposed recycled water pipeline would be attached to an existing bridge and would remain aboveground. Special construction methods, such as trenchless construction, may be used in sensitive areas, such as major stream crossings, major intersections, and at railroad and highway crossings to avoid impacts on these sites. Trenchless construction methods would disturb less surface area than installation by open-cut trenching. Potential areas for trenchless construction would include crossings of the Russian River, Mark West Creek, and Dry Creek.

Interruptions to existing utilities, such as sewer lines or other pipelines would be minimized. In some areas, recycled water pipeline construction would require lane closures along roadways. For most street installations, one or two lanes would be closed during construction, and traffic would be controlled with flaggers or traffic control devices. Road closures would be kept to a minimum and appropriate detours would be provided. As necessary, approximate groundwater levels in the construction areas would be identified prior to construction to determine the extent of dewatering required for construction. In areas with shallow groundwater, dewatering activities would be required. Discharges from general construction activity and trench dewatering would comply with the Regional Water Quality Control Board's (RWQCB) requirements.

Trenching

Trenching is a conventional cut and cover construction technique. At sites with non-native species or no sensitive biological resources present, the recycled water pipelines would be installed using open cut trenching. The trenching technique includes clearing of the construction site, saw cutting pavement (where required), trench excavation, pipe installation, backfill operations, and re-paving where applicable.

For pipeline alignments along paved public rights-of-way, pipeline trenches would be completely backfilled with low-strength concrete based on Sonoma County Permit and Resource Management Department's requirements for such installation (K. Booker and C. Stillman, SCWA, pers. comm., 2006). Pipelines installed outside of paved public rights-of-way would be backfilled using conventional compacted select-soil backfill methods. See Figure 2-7. Up to a 100-foot wide temporary construction easement would be required.

Sufficient space would be available to allow the contractor to cast the spoil to the side of the trench, segregate the top soil from deeper strata, install the pipe, and backfill the trench using the spoil. Pipes would be staged adjacent to the alignment prior to installation of the recycled water pipeline installation. In areas encumbered by existing improvements or environmentally sensitive areas, a narrower construction corridor would be used. Recycled water pipeline construction would occur at a rate of approximately 300-400 feet per day where the pipelines would cross open land or low-use sections of roadways. In more developed areas where there are narrow construction corridors, higher traffic volumes, and/or more utilities, the construction rate is expected to average approximately 100-200 feet per day.

During construction, vertical wall trenches would be temporarily closed at the end of each work day, either by covering with steel trench plates, backfill material, or installing barricades to restrict access depending on physical conditions and conditions of the encroachment permit (along roadways). If the area is paved prior to construction, a temporary patch or covering would be used until final repaving of the affected area occurs. Final paving would occur approximately two to six weeks after recycled water pipeline construction is completed within a given road segment.

Figure 2-7. Pipeline Construction Zones

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Jack and Bore Tunneling

Jack and bore tunneling would be employed in areas where open cut trenching is not feasible due to limited construction area, geotechnical conditions, or presence of sensitive biological resources, such as wetlands or riparian habitat. Jack and bore tunneling is a trenchless construction method that would be utilized for installing underground pipelines for short distances without disturbing the ground surface.

This method employs a horizontal boring machine or an auger that is advanced in a tunnel bore to remove material ahead of the pipe. Powerful hydraulic jacks are used to push pipe from a launch (bore) pit to a receiving pit. As the tunneling machine is driven forward, a jacking pipe is added into the pipe string. Each bore and jack undercrossing would require both a jacking pit and a receiving pit, each measuring approximately 30 feet by 10 feet. The temporary pits typically would be excavated to a maximum depth of 20 feet. Slurry, typically bentonite (an inert clay), is used as a drilling lubricant and processed by separating solids from the slurry and discharging the clear liquid to waterways or storm drains. Recycled water pipeline installation by this method would require approximately one or two weeks per waterway crossing; excavated soils would be retained for backfill.

Horizontal Directional Drilling

Horizontal directional drilling (HDD) is another trenchless construction method that would be utilized for installing underground pipelines without disturbing the ground surface. Using a horizontal drill rig, the pipeline is installed in three stages: (1) a small diameter pilot hole is directionally drilled along a designed directional path; (2) the pilot hole is then enlarged to a diameter that would accommodate the pipeline; and, (3) the pipeline is pulled back through the enlarged hole. Slurry, typically bentonite, is used as a drilling lubricant and processed by separating solids from the slurry and discharging the clear liquid to waterways or storm drains. Recycled water pipeline installation by this method would require approximately one or two weeks per waterway crossing.

Pipeline Suspension

Pipeline suspension is a fourth construction alternative for recycled water pipeline installation and could occur at locations with bridges that cross streams/rivers. Pipeline construction at these crossings could occur by installing the pipeline in the structural supports underneath or on the sides of the bridges. Design of the bridge crossings (e.g., pipe material and placement) would be determined during the design phase through review of the design specifications of the bridges. Pipeline installation by this method would require approximately one to two weeks per bridge crossing. No excavation would be required.

Surface Restoration

The final phase of pipeline construction would be surface restoration. In areas where pipe is installed along roadways, repaving would be the final step. Where temporary patching is done, permanent repaving would be the final step. Final repaving would be done either after the entire pipe construction is complete or after segments of pipe construction are complete. Unpaved surfaces would be restored by replanting appropriate vegetation.

Construction of Reservoirs

Construction would involve the use of heavy equipment and would include site preparation and clearing, excavation, earth movement, embankment construction, and hydroseeding. It is anticipated that soil and rock materials on site would be adequate in both quantity and strength for dam construction. Other materials, including clean sand and gravel (for chimney and foundation drains), pipe, and concrete, would be imported from commercial off-site sources. If necessary, the reservoirs would be lined with a clay liner, or include cutoff trenches into impervious strata below the embankment dams, to prevent percolation of tertiary treated recycled water out of the reservoirs. Construction of the reservoirs would each require at least one, and possibly two, construction seasons for completion.

Construction of Booster and Distribution Pump Stations

Underbrush and vines that would interfere with construction and operation of the pumping station would be removed from the site, after which the site would be graded. Following rough grading, additional excavation would bring the site to final grade and prepare the soil for underground piping and structural slabs. Site work would involve installing manholes, structural foundations, curbs, site drainage, and sidewalks. After the structure has been erected and roofed, electrical equipment (e.g., machinery control consoles, switchboards, lighting, etc.) would be installed. Pumps would be installed and piped through the process facilities.

Staging Areas

At various locations within the construction zones, staging areas would be required to store pipe, construction equipment, and other construction-related items. Staging areas would be established near construction zones that are open and easily accessed (e.g., vacant lots). In some situations, staging areas may be used for the duration of the proposed project. In other cases, as pipeline construction proceeds along a route, the staging area may also be moved to minimize hauling distances and avoid disrupting any one area for extended periods of time. Contractors are expected to negotiate short-term temporary easements for staging areas. The location of the staging areas would be determined by the contractor and would typically be located every three miles along the pipeline alignment. Generally, the staging areas would be located in previously disturbed or non-vegetated areas and would not be located in sensitive areas, such as a wetland or a stream.

Construction Equipment

Construction would involve grading, excavation, structural erection, and backfilling at the proposed project sites. Energy efficient equipment would be used where feasible. Heavy construction would include the following equipment:

- Tunnel boring machine
- Pavement saw
- Jack hammers
- Back hoe
- Front-end loaders
- 10-wheel dump trucks
- Flat-bed delivery truck
- Sweepers
- Road grader (for widening at detours along shoulders)
- Paving equipment: back hoe, asphalt hauling trucks, compactors, paving machine, rollers
- Crane
- Compactor
- Water truck
- Trench shields
- Air compressors
- Concrete trucks
- Concrete pumper trucks
- Welding trucks
- Side boom pipe handler tractor
- Earth movers (Scrapers)
- Bulldozers
- Excavators

Construction Schedule

NSCARP is expected to be constructed in phases over a 10-20 year period. The implementation schedule for the proposed facilities would depend on funding, development rates, and resulting flow generation within the NSCARP area. The pipeline alignments may be implemented in phases that may not specifically correspond with the node alignments shown in this EIR/EIS.

Operations

The proposed recycled water pipeline systems would primarily operate year-round. The reservoirs would be filled primarily in the winter with recycled water. In the summer and fall, recycled water stored in the reservoirs would be delivered to users.

Under normal operating conditions, pressure in the Geysers Pipeline would be sufficient for filling some of the proposed reservoirs by way of dedicated transmission pipelines or by conveyance through subarea transmission pipeline systems. Where pressure in the Geysers Pipeline is inadequate to fill a particular reservoir, supplemental booster and distribution pump stations would be needed.

Releases of storage water to meet irrigation demands within the respective service areas would be accomplished by gravity flow through low-level outlet conduits through the dams at each reservoir, where possible. Where the elevation of a particular reservoir is inadequate to pressurize satisfactorily the transmission system, a distribution pumping station would be used.

Maintenance

Age, wear, and seismic activity all contribute to the degradation of the water storage and conveyance systems as time progresses. Routine maintenance would be performed of the NSCARP facilities to uphold the integrity of the system and to ensure water delivery capability.

Maintenance activities would be performed on the facilities on a defined schedule. These would include either annual, semi-annual, monthly, and/or weekly inspection, maintenance, repair, and/or replacement of:

- Segments of pipelines;
- Air release valves;
- Leaks;
- Cathodic protection devices;
- Valves;
- Appurtenances, fittings, manholes and meters;
- Vaults;
- Pond floats and cell sites.
- Telemetry cables/systems;
- Access roads;
- Booster and distribution pump stations;
- Electrical control equipment
- Slide gates,
- Motor control centers
- Valves and appurtenances;

Staging and Off-road Vehicle Access

Staging areas would be project-specific. The SCWA would attempt to use previously disturbed areas for staging to the extent possible. Staging areas would be determined prior to commencement of maintenance activities. Equipment would be placed in staging areas and surrounded by orange cones, caution tape, and/or fencing. Site preparation would typically not be required; however, if staging occurs in previously undisturbed areas, SCWA personnel would follow defined procedures (including pre-activity biological surveys) and implement best management practices (BMPs) to avoid significant environmental effects.

Off-road vehicle access would be necessary for several activities to access vaults, blow-offs, and pipeline structures not located along existing roads or access trails. Ventilation valves may be located in rural fields. Vehicles would be driven off-road to access manholes and carry supplies and equipment to the maintenance locations. Off-road vehicular access would be planned in advance of operations. The route would be defined to avoid sensitive resources. A biologist would stake the route in areas of sensitive resources and the defined route would be used for the duration of the maintenance activity.

Pipeline Draining

Routine maintenance may require isolating and draining sections of pipeline to allow for excavation or in-pipe inspection and repair. The proposed pipelines would be designed with special discharge structures to allow for such draining.

The location of proposed discharge structures would vary, but usually would occur at low points in the pipeline to allow for draining of the pipeline via gravity flow. Discharge into local waterways may be accomplished via a gravity flow through blow-off points, depending on terms and conditions imposed by NCRWQCB.

Excavation

Excavation would be required for replacement or repair of water pipeline sections and components, such as valves, vaults, Christy boxes, manholes and appurtenances, fittings, meters, telemetry systems (electric controller cables for remote electronic operation), and blow-off structures.

Repair of Pipeline or Valves

The type of in-pipe repair would depend on the results of inspections and the characteristics of the pipeline. Such repair may include the application of cement-mortar grout at joints or locations where linings are damaged, installation of Weco (rubber-type) seals, welding joints, and the replacement of valves.

Reservoir Maintenance

Maintenance activities at the reservoir sites would include:

- Instrumenting each dam to the minimum required for safety and ongoing collection and evaluation of surveillance measurements. Where applicable, instrumentation will be in accordance with DSOD requirements;

- Transmitting to the State, where applicable, a copy of surveillance measurements with an evaluation;

- Maintenance and repair of dams, including removal of woody vegetation, placement of riprap, and repair or control of leaks;

- Maintenance and repair of spillways, diversion ditches, and eroded areas.

Maintenance of the reservoirs may also include keeping the water table from intercepting the bottom of the reservoir by measures, such as groundwater pumping around the reservoir. Groundwater monitoring wells would be installed around the reservoir and the water table would be regularly monitored. In the event the water table rises close to six feet below ground surface (i.e., the bottom of the reservoir), groundwater would be pumped from the wells to lower the water level. The pumped water would be discharged back to the reservoirs.

2.2.2 *Alternative 1 – No Project*

The “No Action” Alternative means that a regional water conveyance and storage project to serve recycled water to four subareas would not be implemented. Individual recycled water providers identified herein may serve recycled water to some portions of the lands within the four subareas, but there would be no overall regional project. The “No Action” Alternative means that the recycled water providers would have to identify individual projects where recycled water could be used for agricultural purposes. The concern is that the projected supply of water would be greater than the projected demands identified by these providers. In addition, expected reductions in the amount of recycled water that can be discharged by these providers to surface water sources would result in a greater demand for recycled water disposal options.

2.2.3 Alternative 3 – Alexander Valley-Jordan Reservoir Subset

This alternative represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C reservoirs. This alternative would serve a smaller service area commensurate with the amount of potential storage capacity at the two proposed reservoir sites and potential summer recycled water supplies available from the ALWSZ treatment plant. Implementation of Alternative 3 consists of the components highlighted in Table 2-11.

Table 2-11. Alternative 3 Project Components

Subarea	Project Component	Project Alternatives		
		2	3	4
Alexander Valley				
	Jordan A Reservoir	X	X	
	Jordan C Reservoir	X	X	
	Lytton - Existing Reservoir	X		
	Lytton - Enlargement Reservoir	X		
	Robert Young - Enlargement Reservoir	X		
	T-Bar-T Existing - Enlargement Reservoir	X		
	T-Bar-T #1 Reservoir	X		
	Linear feet of pipeline	143,000	88,176	
	Crossing(s) of Russian River	1	1	
	Number of booster pumping stations	2	1	
	Number of distribution pumping stations	1		
	Acres of irrigated area	6,647	3,492	
Dry Creek Valley				
	Passalacqua #3 Reservoir	X		
	Kuimelis #1 Reservoir	X		
	Kuimelis #2 Reservoir	X		
	Approximately 167,000 linear feet of pipeline	167,000		
	Crossing(s) of Dry Creek	3		
	Number of booster pumping stations	2		
	Number of distribution pumping stations	2		
	Acres of irrigated area	6,097		
Russian River Valley				
	Russell-Bucher Reservoir	X		X
	Bucher Reservoir	X		X

Table 2-11. Alternative 3 Project Components (Continued)

Subarea	Project Component	Project Alternatives		
		2	3	4
	Becnel #2 Reservoir	X		X
	J Wine Reservoir	X		
	Gallo Twin Valley Existing Reservoir	X		X
	Denner Ranch #2 Reservoir	X		
	Linear feet of pipeline	142,000		58,608
	Crossings of the Russian River	2		1
	Crossing(s) of Mark West Creek	5		
	Number of booster pumping stations	1		1
	Number of distribution pumping stations	4		2
	Acres of irrigated area	4,506		2,115
Northern Alexander Valley				
	Bilbro-Biocca Reservoir	X		
	Todd Reservoir	X		
	Klein Foods Reservoir	X		
	Gallo Asti -Existing Reservoir	X		
	Linear feet of pipeline	142,000		
	Crossings of the Russian River	2		
	Number of booster pumping stations	3		
	Number of distribution pumping stations	2		
	Acres of irrigated area	4,266		
Totals				
Total combined reservoir storage capacity (af)		**11,229**	**1,821**	**1,145**
Total linear feet of distribution pipeline		**594,000**	**88,176**	**58,608**
Total available water supply (af)		**7,234**	**2,239**	**1,563**
Total acreage served		**21,516**	**3,492**	**2,115**
Total Estimated Project Cost (in millions)		**$385.3**	**$49.9**	**$30.5**

Location

The Alexander Valley-Jordan Reservoir Subset involves construction of the Jordan A and Jordan C reservoirs on the Jordan Vineyards property located about three miles northeast of Healdsburg in the hills on the west side of the Russian River on small unnamed intermittent tributaries. It also involves construction of a transmission pipeline and a booster pumping station. The storage facilities, transmission, conveyance pipelines, and lands to be served are shown in Figure 2-8.

Design

The estimated combined storage capacity for the two reservoirs is about 1,821 af. Details of these two reservoirs have been previously described under Alternative 2. Their design under Alternative 3 would remain unchanged. Together with estimated dry season recycled water supply of approximately 418 af, the total supply available would be about 2,239 af annually. The total acreage served would be about 3,492 acres, resulting in a unit allocation of available supply of about 0.57 af per acre, and approximately 55 percent of the 6,337 acres of agricultural land in the Alexander Valley Floor subarea.

Construction

Construction would involve the use of heavy earthmoving equipment. It is anticipated, but must be confirmed, that soil and rock materials on site would be adequate in both quantity and strength for dam construction. Other materials, including clean sand and gravel (for chimney and foundation drains), pipe, and concrete would be imported from commercial off-site sources. Construction would require at least one, and possible two, construction seasons for completion.

With a few exceptions, the transmission pipelines would be located within public rights-of-way following paved roads and paralleling the Alexander Valley Road Bridge over the Russian River. Where a transmission pipeline would be in a paved public right-of-way, the pipeline trench would be completely backfilled with low-strength concrete in accordance with the Sonoma County Permit and Resource Management Department requirements for such installations (K. Booker and C. Stillman, SCWA, pers. comm.., 2006). It has been assumed that pipelines installed outside of paved public rights-of-way can be backfilled using conventional compacted sand/soil backfill methods.

Figure 2-8 identifies “nodes” within the alternative corresponding to a possible staged approach to system development. In general, the nodes are located at changes in pipe diameter, and branches in the system. Construction of the system would commence at the Geysers Pipeline turnout and proceed to the Jordan reservoirs. Subsequent pipeline construction would proceed west along Alexander Valley Road and Lytton Station Road, then south down West Soda Rock Lane, then east across the Russian River and along Highway 128.

Operations

The turnout at Node 1 (see Figure 2-8) would supply recycled water to the proposed Jordan A and Jordan C reservoirs. A 36-inch diameter turnout pipeline used to gravity-flow water from both reservoirs into the transmission system would also be used for filling the reservoirs from the Geysers Pipeline. Based on an assumption of filling the reservoirs in 30 days, the rate of fill would be about 31 cfs, which is within the capacity of the proposed 36-inch diameter turnout pipeline.

Figure 2-8. Alternative 3. Alexander Valley-Jordan Westside Subset

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There would be a 30-inch diameter primary main line network along portions of Alexander Valley Road, Lytton Station Road, and Highway 128. Branching "dead-end" pipelines would be sized at 6 to 30-inch diameter depending upon the number of acres served. It is anticipated that pipelines larger than 24-inch diameter would be concrete cylinder pipe, and pipelines 24-inch diameter and smaller would be AWWA C905 or C900 PVC pipe.

Maintenance

Maintenance activities would be similar to Alternative 2.

2.2.4 *Alternative 4 – Russian River-Westside Subset*

This alternative represents a scaled-down version of the Russian River Valley subarea. It limits storage reservoir development to the Russell-Bucher, Bucher, and Becnel #2 reservoir sites and utilizes the existing Gallo Twin Valley Reservoir. This alternative involves serving a smaller service area than the Russian River Valley subarea commensurate with the potential storage capacity that has been identified in the hills west of Westside Road, and potential summer recycled water supplies available from the ALWSZ. This scaled-down project is referred to as the Russian River Valley-Westside subset. Implementation of Alternative 4 consists of the components highlighted in Table 2-12.

Table 2-12. Alternative 4 Project Components

Subarea	Project Component	Project Alternatives		
		2	3	4
Alexander Valley				
	Jordan A Reservoir	X	X	
	Jordan C Reservoir	X	X	
	Lytton - Existing Reservoir	X		
	Lytton - Enlargement Reservoir	X		
	Robert Young - Enlargement Reservoir	X		
	T-Bar-T Existing - Enlargement Reservoir	X		
	T-Bar-T #1 Reservoir	X		
	Linear feet of pipeline	143,000	88,176	
	Crossing(s) of Russian River	1	1	
	Number of booster pumping stations	2	1	
	Number of distribution pumping stations	1		
	Acres of irrigated area	6,647	3,492	
Dry Creek Valley				
	Passalacqua #3 Reservoir	X		
	Kuimelis #1 Reservoir	X		
	Kuimelis #2 Reservoir	X		
	Approximately 167,000 linear feet of pipeline	167,000		

Table 2-12. Alternative 4 Project Components (Continued)

Subarea	Project Component	Project Alternatives		
		2	3	4
	Crossing(s) of Dry Creek	3		
	Number of booster pumping stations	2		
	Number of distribution pumping stations	2		
	Acres of irrigated area	6,097		
Russian River Valley				
	Russell-Bucher Reservoir	X		X
	Bucher Reservoir	X		X
	Becnel #2 Reservoir	X		X
	J Wine Reservoir	X		
	Gallo Twin Valley Existing Reservoir	X		X
	Denner Ranch #2 Reservoir	X		
	Linear feet of pipeline	142,000		58,608
	Crossings of the Russian River	2		1
	Crossing(s) of Mark West Creek	5		
	Number of booster pumping stations	1		1
	Number of distribution pumping stations	4		2
	Acres of irrigated area	4,506		2,115
Northern Alexander Valley				
	Bilbro-Biocca Reservoir	X		
	Todd Reservoir	X		
	Klein Foods Reservoir	X		
	Gallo Asti -Existing Reservoir	X		
	Linear feet of pipeline	142,000		
	Crossings of the Russian River	2		
	Number of booster pumping stations	3		
	Number of distribution pumping stations	2		
	Acres of irrigated area	4,266		
	Totals			
Total combined reservoir storage capacity (af)		**11,229**	**1,821**	**1,145**
Total linear feet of distribution pipeline		**594,000**	**88,176**	**58,608**
Total available water supply (af)		**7,234**	**2,239**	**1,563**
Total acreage served		**21,516**	**3,492**	**2,115**
Total Estimated Project Cost (in millions)		**$385.3**	**$49.9**	**$30.5**

Location

The Russian River Valley-Westside Subset Alternative involves construction of three proposed reservoirs in the hills west of the Russian River and use of an existing reservoir. Figure 2-9 shows the storage facilities, transmission and conveyance pipelines, and lands to be served.

Design

The estimated total combined storage capacity for the four reservoirs is 1,145 af. Details of these reservoirs have been previously described under Alternative 2; their design under Alternative 4 would remain unchanged. These reservoirs would be filled primarily during the wet season when excess capacity exists in the Geysers Pipeline. The estimated total combined storage capacity for the four reservoirs is about 1,145 af. Together with estimated dry season recycled water supply of about 418 af, the total supply available would be about 1,563 af annually. The total acreage served would be about 2,115 acres, resulting in a unit allocation of available supply of about 0.74 af per acre.

In addition to reservoir development, this project subset would involve the construction of about 11.1 miles of large diameter transmission pipeline (including one crossing of the Russian River) and two distribution pump stations for conveying recycled water from the source (the Geysers Pipeline) to storage reservoirs, and one booster pump station for the distribution of stored water from the reservoirs to agricultural lands. There would be a turnout from the Geysers Pipeline at Node 1 near the intersection of Eastside Road and the northern boundary of the Molinos Ranch. This turnout is due east and across the Russian River from the proposed Westside reservoir sites and the existing Gallo Twin Valley Reservoir.

Construction

Construction would involve the use of heavy earthmoving equipment. It is anticipated, but must be confirmed, that soil and rock materials on site would be adequate in both quantity and strength for dam construction. Other materials, including clean sand and gravel (for chimney and foundation drains), pipe, and concrete would be imported from commercial off-site sources. Construction would require at least one, and possible two construction seasons for completion.

The proposed pipeline alignments are generally along paved public rights-of-way, although in several locations the alignments are on privately owned parcels. Where a transmission pipeline would be in a paved public right-of-way, the pipeline trench would be completely backfilled with low-strength concrete in accordance with the Sonoma County Permit and Resource Management Department requirements for such installations (Booker, K. and C. Stillman, SCWA, pers. comm., 2006). It has been assumed that pipelines installed outside of paved public rights-of-way can be backfilled using conventional compacted sand/soil backfill methods.

Figure 2-9 identifies “nodes” within the system corresponding to a possible staged approach to system development. In general, the nodes are located at changes in pipe diameter, and branches in the system. Construction of the system would commence at the Geysers Pipeline turnout (Node 1) and proceed westerly across the Russian River to the Westside reservoirs. It has been assumed that subsequent pipeline construction would proceed north from Node 8 along Westside Road and then south from Node 12 along Westside Road to the Gallo Twin Valley Reservoir.

Operations

Based on the total reservoir capacities of 1,145 af, the required rate of flow for filling all the reservoirs is 19.3 cfs. A 30-inch diameter pipeline is proposed between the Geysers Pipeline (Node 1) and Westside Road (Node 12). The pipelines from Node 12 to the proposed Westside Reservoirs would be 12-inch diameter. The capacity of the 24-inch pipeline is estimated to be about 15.1 cfs. At this rate, the three reservoirs (having a total capacity of 895 af) can be filled in about 30 days.

Of the 4,226 acres of agricultural land in the Russian River Valley subarea, about 2,115 acres (50 percent) would be served under this alternative subset project. The foregoing parameters require an 18-inch diameter primary main line network along Westside Road. Pipe diameter would be reduced proceeding north from Node 8 based on the number of acres served. The pipeline proceeding south from Node 12 would be maintained at 18-inch diameter for purposes of filling the Gallo Twin Valley Reservoir. It is anticipated that pipelines larger than 24-inch diameter would be concrete cylinder pipe, and pipelines 24-inch diameter and smaller would be AWWA C905 or C900 PVC pipe.

Maintenance

Maintenance activities would be similar to Alternative 2.

2.3 ENVIRONMENTAL COMMITMENTS

As part of the project planning process, SCWA has incorporated certain environmental commitments into the NSCARP alternatives to avoid or minimize potential impacts. Because these environmental commitments have been incorporated into the project by SCWA, they will not be restated in the impact analysis sections, but instead will be incorporated by reference.

Figure 2-9. Alternative 4. Russian River Valley - Westside Subset

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General Construction Measures

To reduce or eliminate construction-related effects, SCWA determined the following commitments to be feasible and implementable measures to reduce or mitigate short-term construction-related effects. These measures would be implemented, as appropriate, depending on the location of construction and surrounding land uses. The identified measures are as follows:

- Temporary striping, traffic lighting, and signalization for residential and business areas affected by construction;
- Access and parking provisions for residences and business areas;
- Replacement of existing landscaping;
- Coordination with planned improvements (e.g., raised medians, turn lanes, street alignments) to minimize disruptions associated with two or more projects and other projects;
- Restricted work area in residential areas, expressed as a maximum length of open trench for a given segment at any given time;
- Restricted work hours (e.g., Monday through Friday, 7:00 a.m. to 6:00 p.m.);
- Dust suppression and cleanup provisions (e.g., street sweeping, sidewalk cleaning, and debris removal), as needed;
- Restoration of roadway surfaces damaged by construction activities, including hauling operations, to preexisting conditions;
- Establishment of a SCWA point-of-contact to handle ongoing public outreach and address construction concerns;
- Fact sheets and public updates to inform the community about progress of the project; and,
- Restoration of community facilities affected by construction.

A site-specific construction mitigation plan would be finalized after additional community outreach and design and once a project is approved.

Frac-Out Contingency Plan

Directional bore operations have a potential to release drilling fluids into the surface environment through frac-outs. A frac-out is the condition where drilling mud is released through fractured bedrock into the surrounding rock and sand and travels toward the ground surface or the bed of a stream or river. Because drilling muds consist largely of a bentonite clay-water mixture, they are not classified as toxic or hazardous substances. However, if it is released into water bodies, bentonite has the potential to adversely impact fish and invertebrates by fouling breathing and feeding organs.

While drilling fluid seepage associated with a frac-out is most likely to occur near the bore entry and exit points where the drill head is shallow, frac-outs can occur in any location along a directional bore.

To minimize the impacts associated with a potential frac-out, the SCWA shall require its contractor to prepare a Frac-Out Contingency Plan (FCP). The FCP shall establish operational procedures and responsibilities for the prevention, containment, and clean-up of frac-outs associated with stream crossings involving jack and bore or directional drilling. All SCWA personnel and SCWA contractors responsible for the work must adhere to this plan during the boring process.

The specific objectives of this plan are to:

1. Minimize the potential for a frac-out associated with directional drilling activities;
2. Provide for the timely detection of frac-outs;
3. Protect the environmentally sensitive riverbed and associated riparian vegetation;
4. Ensure an organized, timely, and "minimum-impact" response in the event of a frac-out and release of drilling bentonite; and,
5. Ensure that all appropriate notifications are made immediately to the California Department of Fish and Game, NOAA Fisheries, Corps of Engineers, and NCRWQCB within 24 hours; and that required documentation is completed.

Erosion and Sediment Control Plan

SCWA would prepare and implement an erosion control and restoration plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities. The plan would include all the necessary local jurisdiction requirements regarding erosion control and would implement Best Management Practices (BMPs) for erosion and sediment control as required (may be incorporated into the Storm Water Pollution Prevention Plan described below).

Storm Water Pollution Prevention Plan (SWPPP)

SCWA would submit to the NCRWQCB a notice of intent to discharge stormwater before construction and/or operation activities begin and would develop and implement a SWPPP as required by the conditions of a National Pollutant Discharge Elimination System (NPDES) permit. SCWA would prepare a SWPPP that identifies BMPs for discharges and groundwater disposal from dewatering operations associated with intake construction, trench construction, tunneling, and pipeline testing procedures and/or operations. The SWPPP would identify how and where these discharges would be disposed during construction and operations. The SWPPP would include an erosion and sediment control plan, a water quality monitoring plan, a hazardous material management plan, and post-construction/operations BMPs.

Traffic Control Plan

SCWA, in coordination with affected jurisdictions, would develop and implement a traffic control plan for construction activities to reduce construction-related effects on the roadway system and traffic and circulation patterns throughout the affected pipeline alignment area during the construction period. All construction activities would follow the standard construction specifications and procedures of these jurisdictions. The traffic control shall include, but not be limited to, the following:

- Coordinate with the affected jurisdictions on construction hours of operation and lane closures;
- Follow guidelines of the local jurisdiction for road closures caused by construction activities;
- Limit lane closures during peak commuting hours to the extent possible;
- Install traffic control devices as specified in the California Department of Transportation's *Manual of Traffic Controls for Construction and Maintenance Works Zones*;
- Provide notification of road closures in the immediate vicinity of the open trenches in the construction zone;
- Provide access to driveways and private roads outside the immediate construction zone;
- Develop a business notification plan for access to local business in and adjacent to the construction zone;
- Provide alternate routes for bicyclists and pedestrians during sidewalk, bike lane, and recreation trail closures;
- Provide notification to the public of temporary closures of sidewalks, bike lanes, and recreation trails; and,
- Consult with emergency service providers and develop an emergency access plan for emergency vehicles access in and adjacent to the construction zone.

Dust Suppression Plan

SCWA would develop and implement a dust suppression plan to reduce fugitive emissions during construction activities. This plan would be based on guidance from the Northern Sonoma County Air Pollution Control District (NSCAPCD) and the Bay Area Air Quality Management District (BAAQMD). The following practices would be implemented on a site-by-site basis during pipeline construction activities to reduce particulate matter 10 microns or less in diameter (PM_{10}):

- Water all activity construction sites at least twice daily, more often if wind speeds exceed 15 miles per hour;
- Prohibit all grading activities during periods of high wind (i.e., winds greater than 30 miles per hour);
- Stabilize all disturbed areas, including storage piles, that are not being actively used for construction purposes using water, chemical stabilizer/ suppressant, or vegetative groundcover;
- Apply nontoxic binders to exposed areas after cut-and-fill operations and hydroseed area;
- Stabilize all on-site unpaved roads and off-site unpaved access roads using water or chemical stabilizer/suppressant;
- Install wheel washers for exiting trucks;
- Control all land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities using water or by presoaking to control dust emissions;
- Cover or wet down all material being transported off site to limit visible dust emission;
- Limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring;
- Following the addition or removal of materials from the surface of outdoor storage piles, effectively stabilize these piles from creating fugitive dust emissions using water or chemical stabilizers/suppressants;
- Control and limit traffic speeds on unpaved roads for non-landowners based on site conditions; and,
- Replant vegetation in disturbed areas as quickly as possible. In determining the timing of replanting, vegetation type and season would be taken into consideration.

Fire Control Plan

SCWA would develop and implement a fire management plan in consultation with the appropriate city, county and state fire suppression agencies to verify that the necessary fire prevention and response methods are included in the plan. The plan would include fire precaution, pre-suppression, and suppression measures consistent with the policies and standards in the affected jurisdictions.

Phase I and Phase II Hazardous Materials Studies

Prior to construction, SCWA would complete Phase I hazardous materials studies for soil and groundwater contamination in areas where project facilities would be constructed that that might have the potential for hazardous materials (i.e., across farms near farm buildings, near urban areas). Additionally, the recommendations set forth in the Phase I hazardous materials site assessment would be implemented to the satisfaction of the appropriate hazardous materials agencies before construction begins. If Phase I assessments indicate the potential for contamination within or adjacent to the pipeline alignment, Phase II studies would be completed before construction begins. Phase II studies would include soil and groundwater sampling and analysis for anticipated contaminating substances. If soil or groundwater contaminated by potentially hazardous materials is exposed or encountered during construction, the appropriate hazardous materials agencies would be notified. A work plan to characterize and possibly remove contaminants may be required by the appropriate hazardous materials agencies.

Hazardous Materials Management Plan

SCWA would develop and implement a hazardous materials management plan before beginning construction. The plan would include appropriate practices to reduce the likelihood of a spill of toxic chemicals and other hazardous materials during construction. A specific protocol for the proper handling and disposal of materials would be established before construction activities begin and would be enforced by SCWA.

Agricultural Land Restoration

SCWA would prepare and implement an agricultural land restoration plan to ensure agricultural lands that have been disturbed during the construction of the pipeline are returned to pre-project levels of production, where practicable. These lands include agricultural lands used for temporary pipeline construction access or as construction staging areas. During construction, use of these lands as storage areas for pipeline trenching spoils would be avoided. If these areas are used for storage of spoils, SCWA would ensure that spoils are removed after pipeline construction is completed. If necessary, SCWA would also ensure that lands are recontoured, topsoil is replaced, irrigation systems are reestablished, and fences are replaced, where practicable. Where implementation is not practicable, SCWA would follow the Private Property Acquisition and Access environmental commitment described below.

Spoils Disposal Plan

SCWA, in coordination with the construction contractor, would ensure that spoils from excavation activities during construction would be hauled to an appropriate off-site disposal location or used within the construction right-of way, where feasible. The disturbed pipeline right-of-way would be reseeded with the appropriate seed mixture. Spoils materials would not be permanently placed in sensitive habitat areas, such as wetlands, or in floodplains identified by the Federal Emergency Management Agency (FEMA).

Environmental Training

SCWA would inform field management and construction personnel of the need to avoid and protect resources. Communication efforts would occur at preconstruction meetings so that construction personnel are aware of their responsibilities and the importance of compliance.

Trench Safety Plan

SCWA would require that trench safety precautionary measures be implemented during construction activities. These measures would be consistent with the County's standard practices and requirements for roadway construction. These measures shall include, but not be limited to, the following:

- Preparation of a trench safety plan;
- Road and/or lane closures shall be limited to the immediate vicinity of open trenches and the length of open trenches shall be kept as short as possible;
- No unprotected trenches shall be open overnight; and,
- Any pit or hole required to be left open overnight shall be labeled and fenced according to the affected local jurisdiction or the U.S. Occupational Safety and Health Administration (OSHA).

Private Property Acquisition and Access

SCWA would implement the following measures in order to construct and operate facilities within private property:

- Acquire temporary or permanent easements from the landowners or acquire the land in fee simple; landowners would be appropriately compensated for all easements or acquired lands;
- Maintain reasonable access to all private property during construction and maintenance activities; and,

- Notify all affected residents and property owners at least one week before construction or non-emergency maintenance activities.

Noise Compliance

SCWA would design noise-generating facilities to be as quiet as is feasible. At a minimum, all noise-generating facilities would be designed to meet applicable local noise ordinances.

Construction and maintenance activities would be conducted during daytime hours of 7:00 AM to 7:00 PM Monday through Saturday. All maintenance equipment will be have noise control devices and mufflers. Excessive idling of trucks and equipment will be prohibited. Neighbors would be notified if work would be performed outside of allowed work hours due to the nature of the activities. The SCWA would be required to receive permission or waivers from local jurisdictions as appropriate from noise and work ordinances;

Project Planning, Coordination, and Communication Plan

SCWA, the City, the Town, and the ALWSZ would coordinate planning, engineering, and design phases of the project. SCWA would identify a liaison to carry out this coordination and would ensure that the above measures are implemented consistent with local agency policies and that any potential conflicts with other activities are limited.

Site Restoration/Revegetation Plan

SCWA will prepare a Site Restoration and Revegetation Plan (SRRP) that will detail the measures to be implemented to restore sites temporarily disturbed during construction, and to mitigate for permanent vegetation losses resulting from construction of project components.

The SRRP will describe methods for stockpiling and segregating topsoil from subsurface soils in order to backfill in appropriate sequence to assure adequate topsoil for planting.

The plan will detail methods to hydroseed appropriate project components (e.g., pipeline rights-of-way, reservoir embankments, storage and stockpile sites, etc.) to provide fast-growing vegetation to cover and stabilize potential erodible areas.

The SRRP will describe the tree inventory methods to be implemented to determine the number of trees that will be removed for project implementation. The SRRP will identify a number of alternative sites to conduct mitigation plantings. These will include sites within the project area, at parks and other appropriate public lands, at regional restoration sites, etc. The SRRP will describe methods to acquire planting stock, installation methods, and long-term maintenance and monitoring measures.

SCWA staff will coordinate with appropriate federal, state, and county resource specialists to assure plan formulation comports with mitigation required by different agencies and those identified in the final approved EIR/EIS.

2.4 PROJECT FUNDING

NSCARP would be financed with a combination of funding sources, including local funds, grants, loans, and bonds.

Local Agency Funds

The SCWA maintains a recycled water fund that receives transfers annually from the SCWA operations fund for capital projects. These funds can be used for projects that enhance the distribution and use of recycled water.

Grants

The SWRCB administers the Water Recycling Facilities Planning Grant Program to help agencies offset planning costs associated with recycled water projects. Water Recycling Facilities Planning Grants support studies that determine the feasibility of using recycled water to offset the use of potable water from state and/or local sources (SWRCB, 2004). These grants require the completion of planning documentation, including a preliminary engineering report, a draft revenue program and environmental documentation in compliance with CEQA. These grants provide 50% of project planning costs, up to a maximum grant of $75,000. The SWRCB may also provide grants up to 25% of construction costs, up to a maximum of $5 million, for a project through its Water Recycling Funding Program.

The Reclamation Wastewater and Groundwater Study and Facilities Act, Title XVI, Public Law 102-575, gives Reclamation general authority to conduct appraisal and feasibility studies on water reclamation and reuse projects. It also provides general authority for research and demonstration programs to test water reclamation and reuse technologies. Reclamation may also participate in construction of reuse projects after Congressional Authorization of the project. Pursuant to Title XVI, Public Law 102-575, Reclamation provide grant funding for preparation of a feasibility study for NSCARP.

The California Department of Water Resources (DWR) administers the Agricultural and Urban Water Conservation Feasibility Study Grant Program and Capital Outlay Grant Program. These programs provide grants to local agencies undertaking water recycling feasibility studies and projects that facilitate delivery of recycled water to offset potable water use.

Loans

A loan program is available through the SWRCB - State Revolving Fund (SRF) Loan Program. The SRF Loan Program provides funding for construction of publicly-owned treatment facilities and water reclamation projects (SWRCB, 2004). This funding for capital improvements to wastewater treatment and water recycled facilities is authorized under the federal Clean Water Act. As a water recycling project, NSCARP is eligible for SRF funding. The SCWA may apply to the RWQCB to be placed on the SRF Priority List as a Category III project. The loan program offers 20-year repayment periods and interest rates of approximately half that of conventional bond financing. To qualify for such loans, the local sponsor of the project must comply with the planning requirements for disbursement of a Water Recycling Facilities Planning Grant, as described above.

Bonds

Conventional bond financing requires the least resources in terms of project planning, but comes at a significantly higher interest rate than other state financing options. Bonds can have repayment periods of 20 to 30 years and interest rates currently ranging between five and six percent.

2.5 PARTICIPATION IN NSCARP

Prospective users of the recycled water delivered via NSCARP would consist of agricultural interests in the Alexander Valley, Dry Creek Valley, Northern Alexander Valley, and Russian River Valley subareas. Participation in NSCARP would be voluntary and would involve the NSCARP recycled water user and SCWA (or another entity, such as a joint powers authority, depending on who ultimately builds and maintains the NSCARP project) entering into a recycled water agreement. Recycled water users who participate in NSCARP would not be required to transfer or abandon existing water rights as a condition of receiving recycled water.

2.6 USES OF THE ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT

The NSCARP EIR/EIS is intended for use by the NEPA and CEQA lead and responsible agencies with project approval or permit authority for the project alternatives. The specific uses and agencies are indicated below.

Reclamation

- Approval to provide grant funding under Title XVI of Public Law 102-575, as amended.

Sonoma County Water Agency

- EIR Certification
- Approval of the NSCARP and/or individual projects

City of Santa Rosa

- Approval of the NSCARP
- As a responsible agency, this EIR/EIS may be used to support issuance of any permits that may be required from the City

Town of Windsor

- Approval of the NSCARP
- As a responsible agency, this EIR/EIS may be used to support issuance of any permits that may be required from the Town.

2.7 REQUIRED PERMITS AND APPROVALS

Federal, state, regional, county, and city permits and approvals are required for implementation of NSCARP. Those agencies that may have direct permitting authority, and are expected to use this EIR/EIS in granting approval for the project, are:

Federal Agencies

- U.S. Army Corps of Engineers (Corps)
- U.S. Bureau of Reclamation
- U.S. Fish and Wildlife Service (USFWS)
- National Oceanic and Atmospheric Administration, National Ocean Service, National Marine Fisheries Service (NOAA Fisheries)

State Agencies

- California Department of Transportation (Caltrans)
- State Water Resources Control Board (SWRCB)
- California Occupational Safety and Health Administration (CalOSHA)
- California Department of Fish and Game (CDFG)
- State Office of Historic Preservation
- California Department of Conservation
- California Department of Health Services (CDHS)

Regional Agencies

- North Coast Regional Water Quality Control Board (NCRWCB)
- North Sonoma Air Pollution Control District (NSAPCD)

- Bay Area Air Quality Management District (BAAQMD)

County and City Agencies

- County of Sonoma (County)
- Sonoma County Water Agency (SCWA)
- Sonoma County Agricultural and Open Space District
- City of Cloverdale
- City of Healdsburg
- City of Santa Rosa
- Town of Windsor

Table 2-13 lists the various regulatory permits and approvals that have been identified as potential applicable to implementation of the project alterative.

Table 2-13. Summary of Anticipated Regulations, Regulatory Agencies, and Approvals for NSCARP

Regulation	Regulatory Agency	Required Permits/ Agreements/ Authorizations
Federal Regulations		
NEPA	Reclamation (federal lead agency)	Joint EIR/EIS
Clean Water Action Section 404 (33 USC 1344)	Corps	Section 404 permit for discharges of dredged or fill material into waters of the United States, including wetlands.
Rivers and Harbors Act, Section 10 (33 CFR 329.4)	Corps	Section 10 permit for construction of structures in, over, or under; excavation of material from; or deposition of material into navigable waters of the United States.
Clean Water Act Section 402 (33 USC 1311,1342)	NCRWQCB	National Pollutant Discharge Elimination System permit (General Construction Activity Storm Water permit).
Clean Water Act, Porter-Cologne Water Quality Control Act	NCRWQCB	Point Source NPDES - Discharge of treater municipal wastewater from a publicly owned treatment works to waters of the U.S.
Porter-Cologne Water Quality Act	NCRWQCB	Discharge of recycled water to surface water and to groundwater

Table 2-13. Summary of Anticipated Regulations, Regulatory Agencies, and Approvals for NSCARP (Continued)

Regulation	Regulatory Agency	Required Permits/ Agreements/ Authorizations
Clean Water Act Section 401	SWRCB NCRWQCB	Water Quality Certification or Waiver for discharge of dredged or fill material into waters of the United States.
Fish and Wildlife Coordination Act (16 USC 661 et seq.)	USFWS NOAA Fisheries CDFG	Consultation and Fish and Wildlife Coordination Act Report.
Federal Executive Order: Protection of Wetlands	Corps Reclamation (federal lead agency)	Requires federal agencies to follow avoidance/mitigation/preservation procedures before proposing new construction in wetlands.
Endangered Species Act (FESA) (16 USC 1531 et seq.)	USFWS NOAA Fisheries	Section 7 Consultation and take authorization with Biological Opinion.
Migratory Bird Treaty Act	USFWS	Avoidance of take for unlisted migratory bird species, and take authorization for federally listed species via ESA.
National Historic Preservation Act Section 106 (16 USC 470 et seq.)	State Historic Preservation Officer Native American Heritage Commission	Consultation
Clean Air Act - Authority to Construct and Operating Permit	NSCAPCD BAAQMD	Authority to Construct permit to construct or modify a facility that may emit air pollutants from a stationary source into the atmosphere. Operating Permit to operate such facility.
U.S. Council on Environmental Quality Memoranda on Farmland Preservation and Farmland Protection Act (7 USC 4201, 7 CFR 658)	National Resources Conservation Service, Reclamation (federal lead agency)	Requires federal agencies to identify adverse effects of programs on preservation of farmland; consider alternative actions to lessen effects; and ensure compatibility with state, local, and private farmland protection Programs.
Federal Executive Order 12898: Environmental Justice	Reclamation (federal lead agency)	Requires federal agencies to identify and address disproportionately high and adverse human health and environmental effects of federal programs on minority and low-income populations.

Table 2-13. Summary of Anticipated Regulations, Regulatory Agencies, and Approvals for NSCARP (Continued)

Regulation	Regulatory Agency	Required Permits/ Agreements/ Authorizations
Federal Executive Order 11988: Floodplain Management	Reclamation (federal lead agency)	Requires federal agencies to take action to reduce the risk of flood loss and restore and preserve the values of floodplains.
State Regulations		
California Fish and Game Code Section 1602	CDFG - Central Coast Region (Region 3)	1602 - Streambed alteration agreement
California Endangered Species Act (California Fish and Game Code Section 2080 et seq.)	CDFG - Central Coast Region (Region 3)	Consultation, take authorization pursuant to Section 2081 and/or Section 2080.1 (with USFWS consultation), avoidance of “fully protected” species
California Water Code Sections 1700-1746	California State Water Resources Control Board - Division of Water Rights	Water Rights Amendment or Change Petition (to originally permitted appropriative right), if necessary
	California State Water Resources Control Board	Petition for Change - Change in location or amount of current recycled water discharge
California Water Code, Division 3, Dams and Reservoirs Parts 1 and 2	DWR, Division of Safety of Dams	Approval of plans and specifics for construction or enlargement of a dam or reservoir
California Streets and Highways Code Sections 660-734	California Department of Transportation	Encroachment permit
California Health and Safety Code Sections 116275-116750	CDHS	Public Water System permit
Title 22	CDHS	Direct application of recycled water where direct or indirect human contact is likely
California Land Conservation Act (Williamson Act) California Government Code 51200-51295)	California Department Conservation	Acquisition of contracted land by purchasing or by eminent domain
California Labor Code 6500	California Department of Industrial Relations (CalOSHA)	Construction of trenches or excavations 5 feet or deeper and into which a person is required to descend.
California Public Resources Code Section 6000 et. Seq.	California State Lands Commission	Land Use Lease - Placement of fill or structures in navigable waterways, Section 16 or 36 lands.

Table 2-13. Summary of Anticipated Regulations, Regulatory Agencies, and Approvals for NSCARP (Continued)

Regulation	Regulatory Agency	Required Permits/ Agreements/ Authorizations
Regional/Local Regulations		
County Codes California lands Conservation Act (commonly known as Williamson Act)	Sonoma County Permit and Resource Management Department	Genera Plan Consistency 3836 Permit - Construction in flowing waters Subdivision or merger of parcels - If SCWA purchases property, it may need to merge or subdivide parcels
		Use Permit - development of facilities on leased land Cancellation of Williamson Act Contract - The non-renewal of any Williamson Act Contract Road Encroachment Permit - New transmission, water, or gas line crossings or on or across county roads
County Codes	Sonoma County Public Works Department	Grading Permit Transportation Permit - Transport of heavy or oversized loads on county roads
City Ordinances	City Public Works Department	Encroachment Permit - Use of local jurisdictions right-of-way to install pipeline across roadways Transportation Permit - Transport of heavy or oversized loads on city streets
City Ordinances	City of Healdsburg Public Works Department	Encroachment Permit - Use of local jurisdictions right-of-way to install pipeline across roadways Transportation Permit - Transport of heavy or oversized loads on city streets
City Ordinances	Town Public Works Department	Encroachment Permit - Use of local jurisdictions right-of-way to install pipeline across roadways Transportation Permit - Transport of heavy or oversized loads on city streets

Table 2-13. Summary of Anticipated Regulations, Regulatory Agencies, and Approvals for NSCARP (Continued)

Regulation	Regulatory Agency	Required Permits/ Agreements/ Authorizations
City Ordinances	City of Cloverdale	Encroachment Permit - Use of local jurisdictions right-of-way to install pipeline across roadways Transportation Permit - Transport of heavy or oversized loads on city streets
Utility Line Coordination	California Public Utilities Commission (CPUC) Pacific Gas & Electric Telecom Cable	Compliance with CPUC General Orders that guide utilities in development, construction, maintenance, and operation of utility facilities and Infrastructure Review
Railroad Crossing Coordination	Northwestern Pacific Railroad	Encroachment Easement

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Chapter 3
Environmental Issue Areas

Chapter 3. Environmental Issue Areas

This chapter examines the environmental issues for which the proposed project will or may have adverse impacts. Each section contains four subsections. The Introduction subsection presents introductory information regarding the issue area discussion. The Environmental Setting subsection describes the existing environmental and/or regulatory setting (affected environment) that may affect the project on the issue being discussed. The Impacts and Mitigation Measures subsection evaluates the impacts of the proposed project (environmental consequences) and proposes mitigation measures to lessen or eliminate those impacts to less than significant levels where possible. The Impact After Mitigation discussion describes the level of the project's impacts after implementation of the recommended mitigation measures.

According to Federal and State regulations, a finding of whether a proposed action significantly affects the quality of the human environment is determined by considering the context in which it would occur and the intensity of the action (40 C.F.R. § 1508/27; CEQA Guidelines § 15126.2 [a]). Consistent with these regulations and guidelines, the impact analyses contained in this chapter follow a step-by-step format where each potential impact within an issue area is addressed separately.

Short-term and long-term impacts are analyzed for the Proposed Project. Each impact statement is classified as to the level of significance (Significant and Unavoidable, Significant but Mitigable, Less than Significant, or Beneficial), based on the significance thresholds. The significance threshold is a set of criteria used to judge whether a given consequence of a specific alternative is significant.

Where the impact is identified as "Significant", feasible mitigation measures are proposed with the intent of reducing impacts to less than significant levels. The impact will then be classified as a Class I impact (impacts are significant and there is not sufficient mitigation to reduce impacts below the significance threshold) or a Class II impact (significant impact can be reduced to less than significant levels with mitigation measures). A Class III impact occurs when the impact, without mitigation, is considered less than significant or does not exceed established thresholds. A Class IV impact occurs when the impacts are considered to be beneficial overall as it relates to the environmental issue being analyzed. The impact categories are also summarized as follows:

- Class I. Significant unavoidable adverse impacts that cannot be mitigated to a less than significant level. A Class I impact is one for which a complete solution has not been identified. This determination is based on one or more of the following conditions: there is limited technical and/or scientific knowledge; the tools to mitigate are insufficient to significantly reduce the impact either because of the limits of technical and/or scientific knowledge; or infeasible from a technical perspective. Under CEQA, a Class I impact would require a "finding of overriding consideration" by the SCWA to approve the project.

- Class II. Significant environmental impacts that can be mitigated to less than significant levels. Measures have been identified that can feasibly be implemented and will either: 1) avoid the impact altogether by not taking a certain action or parts of an action; 2) minimize impacts by limiting the degree or magnitude of the action and its implementation; 3) rectify the impact by repairing, rehabilitating, or restoring the affected environment; or 4) compensate for the impact by replacing or providing substitute resources or environments.

- Class III. Adverse environmental impacts that are less than significant or have no identified impact. These impacts, while adverse, are not of a sufficient magnitude, intensity, or duration to significantly disrupt the environment, and have no serious consequences. As a result, no mitigation is required.

- Class IV. Beneficial impacts benefit or improve the environment and no mitigation is required.

3.1 AESTHETICS

This section discusses the potential impacts on visual resources related to visual contrast, view obstruction, and/or loss of visual resources. Degradation of visual quality resulting from loss or alteration of a specific scenic resource (such as mature stands of native trees) or introduction of a new source of high intensity light or glare is also addressed. To provide a basis for this evaluation, the setting section describes the character of the regional landscape and the existing visual conditions of the major landscapes within the NSCARP study area. Additionally, this section discusses community boundaries; and identifies specific features, such as a scenic road or a unique landscape, that are designated by local or State agencies as important scenic resources.

3.1.1 Physical Setting

The proposed project area is located throughout the wine country of Sonoma County, in northwestern California. Sonoma County is bordered on the east by the Mayacamas and the Sonoma Mountains. The region is highly valued by visitors and residents for its unique rural landscape of vineyards, rolling hills, riparian corridors, oak woodlands, architecturally distinct homes and wineries, and small communities. Vineyards dominate the landscape, and rows of grapevines provide a horizontal path for the eye to span the scenery. Because viewers are residents and tourists who are attracted to the setting, there is high viewer sensitivity to changes in the region's visual character. Overall, the region's visual character is of high quality, with vivid and unified views. The landscape is intact (i.e., free from encroaching elements) in most areas. Near cities such as Healdsburg, smaller communities like Geyserville, and industrial/agricultural facilities, the rural scenic landscape is less intact because of development and visible industrial structures and equipment (Jones & Stokes, 2002).

A characteristic that distinguishes Sonoma County from many parts of the San Francisco Bay Area is the continued existence of separate, identifiable cities and communities. As the County urbanizes, maintenance of the openness of these areas provides important visual relief from urban densities. These landscapes have little capacity to absorb very much development without significant visual impact. These lands may not necessarily be highly scenic but provide visual relief from continuous urbanization.

Within the project area, the Mayacamas Mountains provide a scenic backdrop to the east of the project area, while dispersed peaks are prominent to the west. The Highway 101 corridor runs north-south and bisects the project area.

The following provides a description of the general visual characteristics of each valley in the NSCARP study area.

Russian River Valley

The Russian River Valley provides distinctly different visual resources due to the dominance of the larger river channel with its flat floodplain, steep, wooded enclosing slopes, and sinuous corridor. A variety of views are available to travelers moving along this corridor as it winds through coastal range hills.

Alexander Valley

The Alexander Valley forms a large distinctive landscape type comprised of a broad valley floor with intensive agricultural uses, most notably vineyards, surrounded by rugged hills with a variety of woodland, scrub, and grassland vegetation habitat-types. There is considerable agricultural development associated with wineries, farms, and rural residences. The area sustains a high volume of tourist traffic, via Highway 128, and recreational sightseeing associated with the wine industry and the area's scenic qualities. The bridge over Sausal Creek provides a distinct feature and focal point, with an open panorama of the Mayacamas Mountains.

Dry Creek Valley

The Dry Creek Valley is similar in character to the Alexander Valley, although not as broad. It also has a mosaic of vineyards, rural residences and hillsides, mixed with woodland vegetation. While it lacks some of the panoramic mountain views that occur in the Alexander Valley, the Dry Creek Valley has considerable scenic character with the more intensive agricultural and residential development in the floor of the valley contrasting with the wooded hillsides.

Mayacamas Mountains

The Mayacamas Mountains are part of a system of high, rugged, and steeply dissected mountain ranges and valleys extending to the east and north of the NSCARP area. Rising to above 3,000 feet, they form the high background ridges for much of the lower landscapes to the southwest. The steep slopes reveal different vegetation patterns, depending on aspect and elevation, with complex mosaics of darker colored scrub, evergreen forests, and open grassland. Much of the area is sparsely populated with little evidence of man-made features.

Locally Designated Scenic Resources

The Open Space Element of the Sonoma County General Plan designates specific scenic resources in three categories: Community Separators, Scenic Landscape Units, and Scenic Corridors.

Community Separators

Community Separators are designated rural lands or greenbelt areas that are intended to protect the open space that provides visual relief between identifiable cities and communities. These lands are not necessarily scenic in their own right, but impose development restrictions to function as buffers to prevent continuous, corridor-style urbanization patterns. The Community Separator nearest to the NSCARP area is the Windsor/Healdsburg Community Separator, which includes areas along U.S. 101 and lands to the east of the highway. Figure 3.1-1 denotes this Community Separator.

Scenic Landscape Units

Scenic Landscape Units are intended to preserve lands that are considered scenic resources. These lands are largely open space which provide visual relief from urban densities and have little capacity to absorb considerable development without significant visual impact. The General Plan identifies the importance of the scenic landscape units occurring in the NSCARP area in the following:

- **Alexander Valley and Dry Creek Valley** - In addition to aesthetics, the scenic quality of these valleys is important from an economic standpoint, as agricultural marketing is tied to scenic quality. The hills along U.S. 101 and above the valley floor are particularly sensitive visual resources.

- **Eastside Road** - This area of rolling hills signifies an important transition between the community of Windsor and the agricultural and mineral resource areas of the Russian River Valley. A portion of the proposed pipeline would be located along Eastside Road.

- **River Road** - This scenic corridor crosses both the Alexander and Russian River valleys, and provides a variety of landscapes, including valleys planted in vineyards, orchard covered hillsides and redwood groves adjacent to the Russian River. A portion of the proposed pipeline would be located along River Road.

- **Hills East of Windsor** - These hills provide a scenic backdrop to the Santa Rosa Plain. North of Windsor, the area extends into the plain and adjoins the low, rolling hills that form part of the Healdsburg-Windsor Community Separator.

- **Sonoma Mountains** - These scenic lands define the eastern edge of the Santa Rosa Plain between Petaluma, and Sonoma and provide an important backdrop to the urban valley.

Scenic Corridors

Scenic Corridors are designated roadways that pass through scenic areas, typically orchards, forest-covered hills, dairy lands, and valleys planted in vineyards. General Plan policies are intended to preserve these scenic roadside landscapes through compatible land-uses, setback restrictions, signage restrictions, and vegetation protection. Scenic Corridors designated by the County within the NSCARP area include all or a portion of:

- U.S. Highway 101
- State Route 128
- River Road
- Westside Road

- Dry Creek Road
- Canyon Road
- Dutcher Creek Road

3.1.2 Regulatory Setting

The Sonoma County General Plan Open Space Element identifies goals, objectives, and policies that provide guidance for the implementation of the NSCARP project in relation to aesthetic resources. Refer to Section 3.9, Table 3.9.3 for a list of applicable goals, objectives, and policies of the Sonoma County General Plan regarding aesthetics.

3.1.3 Methodology

Potential impacts to visual resources were evaluated through site visits to the project area. The amount of visual change introduced by NSCARP project components was assessed based on the degree to which visual changes may be visible to viewers, as well as general sensitivity of viewers to landscape alterations.

Visual changes are measured by three factors: the amount of visual contrast that project components create (changes to form, line, color, texture, and scale in the landscape); the amount of view obstruction (loss of view) that occurs; and, degradation of specific scenic resources (e.g., removal of tree stands). The components of visual sensitivity include the existing visual quality of the setting and anticipated level of viewer concern. The level of interest or concern of viewers regarding an area's visual resources is based primarily on scenic expectations associated with viewer activity types.

3.1.4 CEQA Thresholds of Significance Criteria

Evaluation criteria and significance thresholds for Aesthetics are presented in Table 3.1-2. These criteria are drawn from CEQA requirements and supplemented with applicable goals, objectives, and policies from the Sonoma County General Plan. Visual resource impacts would be considered significant if visual contrast is strong as a result of changes introduced by the NSCARP that result in landscape colors, textures, and scale of visual components that are inconsistent with the natural surroundings. View obstruction would be considered significant if the NSCARP would obstruct views from foreground or middleground vantage points within sensitive viewing areas. Degraded visual quality would be considered significant if the NSCARP severely alters or displaces specific scenic resources, including stands of trees, rock outcroppings, or historic structures. Visual impacts would be considered significant overall if any one of the three measures of significance is identified.

Figure 3.1-1. Windsor/Healdsburg Community Separator

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Table 3.1-1. CEQA Evaluation Criteria/Thresholds of Significance Criteria

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will the NSCARP have a substantial adverse effect on scenic vistas or substantially damage scenic resources including those designated by the Sonoma County General Plan or Caltrans designated Scenic Highways?	Level of visual contrast, view obstruction, degradation in visual quality resulting from tree removal, introduced modifications to the scenic vista, and/or modification or elimination of rock outcroppings.	• Strong visual contrast[1]; • View obstruction[2] from foreground[3] or middleground[3] vantage points; or • Loss or alteration of a specific scenic resource[4].	CEQA Guidelines Appendix G, Checklist Items I(a) and (b) Sonoma County General Plan, Open Space Element
2. Will the NSCARP substantially degrade the existing visual character of the site or its surroundings, including views from private residences, high volume travel ways[5], recreation use areas[6], or other public use areas[7]?	Level of visual contrast, view obstruction, degradation in visual quality resulting from tree removal, introduced modifications to the scenic vista, and/or modification or elimination of rock outcroppings.	• Strong visual contrast; • View obstruction from foreground or middleground vantage points; or • Loss or alteration of a specific scenic resource.	CEQA Guidelines Appendix G, Checklist Item I(c) Sonoma County General Plan, Open Space Element
3. Will the NSCARP create a new light source?	High intensity light or glare towards private residences.	Greater than 0 residences affected.	CEQA Guidelines Appendix G, Checklist Item I(d)

[1] Strong Visual Contrast - (one or more of the following) regraded land forms are flat with little to no contour: line of major ridgeline is altered and not consistent with surrounding ridgelines or minor ridgelines are eliminated; inconsistent color with adjacent landscape character; elimination of landscape texture created by exposed soil or removal of vegetation; form of project grossly exceeds scale of natural land forms.

[2] Viewed area defined as area of landscape (i.e., everything except sky) as shown in a photograph from the closest sensitive viewpoint, taken with a normal (50 mm) lens.

[3] Foreground: 0-1/2 mile; Middle ground: 1/2-3 miles

[4] Specific Scenic Resource - (one or more of the following) landscape component that creates striking feature; Landform - steep (>60%) undulating/dissected slopes, distinctive rock outcrops, or pronounced ridgelines; Water - major bodies of water that provide reflective qualities and irregular shorelines, or major/permanent streams/rivers with diversity of meanders, flows, rapids, rock outcrops, or river-banks; Vegetation - mature stands of native or cultural species (oaks and eucalyptus) in natural groves or distinct planted patterns (i.e., eucalyptus along roads or as planted wind breaks).

[5] High volume travelways: State highways not part of the State Scenic Highway system and City or County arterial roadways.

[6] Recreation use areas: Designated recreation sites, parks, trails, or other areas managed for public recreation.

[7] Public use area: Downtown areas, cemeteries, community centers, attracting the public on a daily or regular basis.

3.1.5 Alternatives Analysis

Alternative 1 (No Project/Action)

The "No Action" Alternative means that the SCWA would not implement a regional water conveyance and storage project to serve recycled water to the NSCARP area. Because no project construction or operational activities would occur, there would be no impact to aesthetics as a result of implementation of Alternative 1.

Alternative 2 (Entire NSCARP)

Impact AES-1: NSCARP potentially could have a substantial adverse effect on the visual character and scenic resources on the project area based on evaluation criteria 1 and 2.

Discussion: Within the NSCARP area, agricultural irrigation activities would potentially occur within Scenic Landscape Units and along Scenic Highways and Scenic Corridors. Irrigated areas would be likely visible from private residences, high volume travelways, recreation-use areas, or other public areas. A summary of impacts resulting from Alternative is presented in Table 3.1-3.

Recycled Water Pipelines

Construction of the recycled water pipelines would result in short-term impacts to scenic resources. Construction activities would require the use of heavy equipment and storage of materials at construction sites. During construction, excavated areas, stockpiled soils, and other materials within the construction easement and staging areas would constitute negative aesthetic elements in the visual landscape. These negative aesthetic elements would directly affect scenic landscape units and scenic corridors as designated by the Sonoma County General Plan. However, these effects would be temporary during project construction and would not significantly impact the long-term visual character of the area. Surface restoration would involve repaving roadways and replanting grasses, shrubs, and trees in unpaved areas outside of the roadways.

Long-terms impacts to aesthetic resources from construction of the recycled water pipelines could occur where the pipelines are above-ground and visible. The recycled water pipelines would be buried, except for the recycled water pipelines suspended beneath bridge crossings. These suspended recycled water pipelines would not be visible and would not impair or obstruct any scenic resources. NSCARP does not involve construction of connecting pipelines (where the user connects to the system). These above-ground pipelines would be consistent with agricultural landscapes and would not significantly impair scenic resources.

Pipelines are underground structures and would not conflict with the 20-foot setback requirement and would not be considered a permanent building or structure or a permanent obstruction of views associated with this component.

Storage Reservoirs

Construction of the proposed storage reservoirs would result in short-term impacts to aesthetic resources. Vineyards characterize the existing visual character of the storage reservoir sites. Construction activities would require the use of heavy equipment and storage materials on-site. During construction, excavated areas, stockpiled soils, and other materials at the construction site and staging areas would constitute negative aesthetic elements in the visual landscape. However, these effects would be temporary during project construction and would not significantly impact the long-term visual character of the area.

Tree removal would occur at reservoir sites and may potentially create significant adverse effects on visual resources where there would be large removals of trees in public areas; however, trees removed on private property would not be an issue. A vegetation clearing program would not be maintained within a permanent construction easement, although trees may have to be cleared in certain areas to enable site access.

The NSCARP area contains Community Separators, Scenic Landscape Units, and designated Scenic Highways or Scenic Corridors. Placement of storage reservoirs within the viewsheds of these scenic resources or within the viewsheds of private residences, high-volume travelways, recreational areas or public use areas, would create potentially significant impacts related to the presence, scale and appearance of the storage facilities.

Specific locations proposed for the reservoirs component of NSCARP include areas along and in the vicinity of public roadways, including designated Scenic Corridors such as River Road and U.S. 101. Proposed reservoirs potentially affecting public roadways and Scenic Corridors would include areas of flatland and hillsides. The following proposed and existing reservoirs proposed for possible expansion are located within adjacent or in close proximity to public roadways in the NSCARP area: J-Wine, T-Bar-T #1, existing T-Bar-T (expansion), existing Robert Young (expansion), Todd, Bilbro-Biocca, Passalacqua #2, and Kumelis #1. Overall, the large majority of the proposed storage reservoirs is located in hilly topography well off of public roadways and thus would not be highly visible from such roadways.

Reservoirs would be constructed by berming on level sites or by damming natural drainages or valleys with earth-filled embankment dams in hillside areas. Storage facilities in hillside areas may also require smaller back dams or drainage diversion structures around the storage area.

Level Sites

Construction of storage facilities on level sites would involve clearing the site of vegetation, excavating to a depth of 10 to 20 feet, and constructing a continuous berm around the reservoir to hold the stored water. The berm typically would be 30 feet in height above ground level, with a slope ratio of 2.5:1. The slope would be geometric and non-undulating. Depending on the size and configuration of the facility, the length of the berm could be one-quarter mile or more on each side of the reservoir.

During and immediately after construction, the site would have a bare, unnatural appearance, with the exposed face of the berm creating strong visual contrast with the surrounding landscape. Under Mitigation Measure 3.1-1, as part of the NSCARP, construction scars would be revegetated. After revegetation, the appearance would be less stark, with grasses covering the slopes of the berm; however, the geometric character of the berm would still produce a strong level of visual contrast. No trees or shrubs would be provided on berms or dams because invasive roots can undermine the structural integrity, and there would be no opportunity to create a more natural appearance on the berm with varied heights and types of vegetation. In addition, in locations where the reservoir site would be overlooked from higher elevations, there would be potential for significant impacts from the visual contrast as water levels fluctuate during different times of the year.

Due to the height and length of the berming, along with the level nature of the surrounding topography, there would be potential for significant view obstruction from adjacent roadways and other public viewpoints, as well as from any nearby residences. Also, depending upon the location of the reservoir site, specific visual resources, such as any stands of mature trees on the site, could be significantly impacted.

Figures 3.1-2 and 3.1-3 depict existing and computer-simulated views after construction for flatland and hillside storage reservoirs, respectively. These views are representative samples of how these storage reservoirs may potentially be implemented.

<u>Hillside Sites</u>

Construction of the hillside storage reservoirs and associated facilities could also change the visual character of the site and its surroundings. During construction, visual contrast would be introduced by several construction activities:

- Clearing of vegetation and removal of tree stumps and roots at dam and reservoir areas;
- Stripping of dam foundation and on-site borrow areas;
- Dam foundation excavation and on-site borrow area excavation; and,
- Construction of appurtenant structures and ancillary facilities such as spillway, inlet/outlet conduits, diversion channels, pipelines, access roads, and fencing.

The main visual focus of the hillside reservoirs would be the earthen dams, which would block off rural valleys and anchor into adjoining hillsides ranging in height from 80 to over 200 feet. The face of each dam would be a geometric, non-undulating slope, and the dam ridgeline would be flat. During, immediately after construction, and prior to revegetation, the exposed soil face of the dam would introduce strong visual contrast compared to the surrounding landscape. Under Mitigation 3.1-1, the revegetation of temporarily disturbed sites and construction scars would create a less stark appearance, with grasses covering the slope of the dam. However, the geometric character of the dam would still produce a strong level of visual contrast.

Where viewsheds provide elevated views of the reservoir surface, there would be potential for significant impacts from the visual contrast as water levels fluctuate during different times of the year. Similar to the bermed storage facilities, during some periods the reservoirs would look dry, and the fluctuating water levels would increase the difficulty of establishing vegetation within the reservoir. Due to the height of dams for hillside reservoirs, there would be potential for significant view obstruction from adjacent roadways and other public viewpoints, as well as from any nearby residences, depending upon the orientation of the dam face, and the direction of viewsheds. Also, depending upon the location of the reservoir site, specific visual resources, such as any stands of mature trees on the site, could be significantly impacted.

Pump Stations

With the possible exception of pump stations, none of the irrigation facilities would conflict with the 20-foot setback along Sonoma County scenic corridors. Above-ground facilities, such as sprinklers, would not be considered a permanent building or structure. Pump stations located along designated Scenic Highways and Corridors would have to conform to the 20-foot setback requirement (see Mitigation AES-1). Figure 3.1-4 shows an example of an existing view from a public road and a computer simulation of what the view may look like with a pump station.

Community Separators

For Alternative 2, pipeline segments, pump stations, and a reservoir would be placed inside, or directly adjacent to, land designated by the County as the Healdsburg-Windsor Community Separator. Table 3.1-2 summarizes the approximate footages of pipelines, number of pump stations, and/or approximate square footage of reservoir within designated Community Separators for each Alternative 2 subarea.

Table 3.1-2. Impacts to the Healdsburg-Windsor Community Separator

Subarea	Pipeline (ft.)	Pump Station	Reservoir (sq. ft.)
Alexander	17,600	1 (Lytton)	0
Dry Creek	87,600	0	0
Northern Alexander	0	0	0
Russian River	28,800	1 (J-Wine)	5,600 (J-Wine)
Total	134,000	2	5,600

Because Community Separators are intended to provide visual relief between cities and communities, they are required to maintain rural, undeveloped visual characteristics. Short-term impacts related to all three appurtenances summarized in the above table would result from construction activities. Only pump stations and reservoirs would represent long-term visual changes to the character of the Community Separators;

however, pump stations would be limited (two in total) and there would be only one reservoir impacting a designated Community Separator. Neither of these latter two project elements would represent a pattern of corridor-style urbanization. Furthermore, as Community Separators are not necessarily intended to be scenic, the introduction of two pump stations and a reservoir to these rural lands would not represent a significant impact.

Impact Category: Significant but Mitigable

CEQA Thresholds of Significance Criteria: 1, 2

Mitigation Measure AES-1:

- The SCWA shall minimize construction zones/staging areas to the extent feasible;
- Following construction activities, the SCWA shall restore disturbed areas by reestablishing exiting topography, including repaving roadways, replanting trees, and/or reseeding with a native seed mix typical of the immediate surrounding areas;
- The SCWA shall revegetate the berms around the reservoirs with native seed mixes to soften the visual effect of the reservoirs from adjacent roadways; and,
- SCWA shall use design elements to enhance visual integration of the booster and distribution pump stations with their surroundings. These proposed facilities shall be painted low-glare earth-tone colors that blend with their surrounding terrain; highly reflective building materials and/or finishes shall not be used in the designs for proposed facilities. Pumping stations shall be screened with vegetation as much as feasible. Where applicable, pump-station placement shall adhere to the 20-foot County setback requirement for those stations located along designated Scenic Corridors.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure AES-1 would reduce visual impacts to a less than significant level.

Impact AES-2: NSCARP would introduce new sources of light to the project area.

Discussion: Generally, nighttime work is not proposed. However, some nighttime work may occur in Caltrans right-of-ways per applicable requirements. In the event of any such work, the light sources utilized during construction would be likely to affect nearby residences. In such circumstances, this would constitute a significant, although temporary, impact.

Figure 3.1-2. Simulated Flatland Reservoir Site

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Figure 3.1-3. Simulated Hillside Reservoir Site

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Figure 3.1-4. Simulated Pump Station

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Exterior emergency lighting would be installed around the storage reservoirs and distribution and booster pump stations. Exterior lighting could adversely affect day and nighttime views by introducing a new source of light and glare. The lighting would be used for security purposes only and would be timed. Low-intensity lights may be used to illuminate the pump house areas during operation and maintenance activities. Lights would only be turned on by personnel when needed and would not operate on a continuous basis.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 3

Mitigation Measure AES-2:

A. Light sources that are utilized during nighttime construction activities shall be shielded and directional so as to minimize light-spill. Thus, significant impacts from nighttime light and glare would be avoided; and,

B. The exterior lighting installed around the storage reservoirs and distribution and booster pump stations shall be a minimum standard required to ensure safe visibility. Lighting also shall be shielded and directed downward to minimize impacts of light and glare.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure AES-2 would reduce impacts from lighting to a less than significant level.

Alternative 3 (Alexander Valley-Jordan Reservoir Subset)

The study area for Alternative 3 is located in the same region as Alternative 2, but is smaller in scale. Alternative 3 would result in similar impacts to aesthetics as under Alternative 2 from construction of recycled water pipelines, storage reservoirs, and distribution and booster pump stations. However, total visual impacts would be less because considerably less recycled water pipelines would be constructed, as would only two reservoirs (Jordan A and Jordan C) and only one pumping station. Alternative 3 is located outside of the Healdsburg-Windsor Community Separator. Although smaller in geographical scale, impacts resulting from this alternative would be similar to those discussed in Alternative 2 and would be subject to the same mitigation measures.

Alternative 4 (Russian River Valley-Westside Subset)

The study area for Alternative 4 is located in the same region as Alternative 2, but is smaller in scale. Alternative 4 would result in similar impacts to aesthetics as under Alternative 2 from construction of recycled water pipelines, storage reservoirs, and distribution and booster pump stations. However, total visual impacts would be less because considerably less recycled water pipelines would be constructed, only three pumping station, as would only three new reservoirs (Russel-Bucher, Bucher, and Becnel #2 reservoir sites) and the existing Gallo Twin Valley Reservoir. Approximately 2,000 feet of pipeline would be located in the Healdsburg-Windsor Community Separator; however, impacts to visual resources would be limited to temporary construction activities and would not directly or indirectly create an urbanized corridor. Although smaller in geographical scale, impacts resulting from this alternative would be similar to those discussed in Alternative 2 and would be subject to the same mitigation measures.

3.2 AGRICULTURAL RESOURCES

The purpose of the Agricultural Resources section is to determine whether implementation of NSCARP would result in significant environmental impacts to agricultural resources. This section addresses potential impacts of the NSCARP associated with the loss of important agricultural lands, conflicts with Williamson Act contracts, reduction of agricultural soil productivity due to erosion, the build-up of trace elements or salinity in agricultural soils, conversion of timberlands to non-timber uses, and potential for damage to adjacent vineyards by increased glassy-winged sharpshooter (GWSS) *(Homalodisca coagulata)* populations. To provide a context for these analyses, the setting section provides information on classification of farmlands and data on existing agriculture in the NSCARP area.

3.2.1 Physical Setting

Agricultural resources provide Sonoma County with important economic resources as well as provide scenic tourist attractions. Approximately 60 percent of the County is utilized for agricultural purposes (California Department of Conservation, 2000). The NSCARP area is predominantly agricultural with the greatest emphasis on orchard crops and vineyards. Orchard crops within the region include plums, pears, apples, cherries and walnuts. The hillsides surrounding the valleys provide grazing lands for cattle and sheep.

According to the Sonoma County, Office of Agricultural Commissioner, 43,589 acres in Sonoma County are dedicated to grape-growing, while 2,933 acres are used to grow apples, 611 acres are cultivated to grow other fruits and nuts, and 438 acres to grow vegetables (Sonoma County, 2002).

Important Farmland

According to the Important Farmland in California, 2002 (California Department of Conservation, 2002), Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Grazing Land, and Urban and Built-Up Land are located within and adjacent to the project area. The following is a brief description of the farmland classifications:

- Prime Farmland is defined by the California Department of Conservation as land that has the best combination of physical and chemical characteristics for the long-term production of crops. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops;

- Farmland of Statewide Importance is similar to Prime Farmland; however, this category of land generally has greater slopes or a lesser ability to hold and store moisture;

- Unique Farmland has lesser quality soils and is used for the production of specific high economic value crops. Examples of crops on Unique Farmland include oranges, olives, avocados, rice, grapes, and cut flowers; and,

- Farmland of Local Importance is of importance to local agricultural economies and is determined by each county's board of supervisors and local advisory committees. Farmland of Local Importance includes but is not limited to dairies and dryland farming.

Throughout this section these categories of farmlands: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance, are referred to collectively as Farmland, or status farmlands. The lands that comprise status farmlands do not include grazing land, which is a separate classification. Farmlands within the project area are identified on Figure 3.2-1.

Williamson Act Lands

The California Land Conservation Act of 1965 (Williamson Act) enables private landowners to enter into contracts with local governments to restrict specific parcels of land for agricultural use. The Williamson Act was adopted to provide agricultural landowners on the urban fringe, who were under pressure to convert their lands to urban use, with a financially viable alternative to conversion. Under the Williamson Act, agricultural landowners can receive property tax assessments that are much lower than other landowners because the assessments are based on generated agricultural income rather than on market (i.e., development) potential. In return, the landowners enter into contracts committing to maintain their lands for agricultural use. Approximately one-half of the state's agricultural lands (approximately 16 million acres) are subject to Williamson Act contracts.

The minimum term for a Williamson Act contract is 10 years, with automatic renewal at the end of each term. At that time, contracts can be terminated by the landowner or local government, which initiates the process of "nonrenewal." If a property is designated for contract nonrenewal, property tax rates gradually increase during the remainder of the contract term until they reach market (i.e., non-restricted) levels. Williamson Act contracts can also be cancelled without completing the non-renewal process. Contract cancellation, however, involves a comprehensive review and approval process and the payment of fees by the landowner equal to 12 percent of the full market value of the property.

Within Sonoma County, certain agricultural lands, open space and unique habitat areas are designated as "Agricultural Preserves" in order to preserve a maximum amount of the limited supply, while conserving an important economic resource, ensuring adequate food supply for future generations, and preserving lands within unique open space or habitat value. Once lands are placed in an Agricultural Preserve, the County will offer a contract to agricultural lands meeting the contract qualifications within that preserve. Within Sonoma County, there are two types of Agricultural Preserves: Type A-I and Type A-II. Type A-I agricultural contracts are for lands used in intensive agricultural operations, such as orchards, vineyards, irrigated pasturelands, and prime soils capable of high production. Type A-II agricultural contracts are reserved for lands used in extensive agricultural operations such as sheep and cattle grazing and dairies. Type A-II agricultural contracts are also used for the preservation of open space uses or critical habitat.

Figure 3.2-1. Farmland with the NSCARP Area

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Agricultural Crop Summary

Table 3.2-1 presents approximate bearing acreage and cash value of the most important crops in Sonoma County for 2001. The table indicates the dominance of viticulture in terms of cash value, while field crops had the greatest acreage in production.

Table 3.2-1. Sonoma County Agricultural Summary

Crop	Acreage	Cash Value
Grapes	43,589	$374,389,700
Apples	2,933	$5,905,400
Other Fruits and Nuts	611	$643,400
Vegetables	438	$10,119,500
Livestock and Poultry	N/A	$55,326,700
Livestock and Poultry Products (including milk)	N/A	$99,691,200
Field Crops (except woodland)	229,062	$7,793,700

Source: Sonoma County, 2002.

Examples of Recycled Water Use in California Cities

Approximately 166 California cities currently utilize recycled water for agricultural, landscape, golf course, parks, pasture and schools irrigation. Table 3.2-2 provides California cities that utilize recycled water for agricultural irrigation purposes.

Table 3.2-2. California Cities Utilizing Recycled Water for Agricultural Purposes

City	Agricultural Use
Bakersfield	Fiber, fodder, and grain crop irrigation, hay irrigation
Calipatria	Crop irrigation
Calistoga	Vineyards
Camarillo	Lemons and seed irrigation, pastures
Carlsbad	Crop irrigation
Castroville	Artichoke and other food crops irrigation
Chino	Crop irrigation
Chino Hills	Crop irrigation
Coalinga	Crop irrigation
Cocoran	Alfalfa and corn irrigation
Davenport	Brussels sprouts irrigation
Delano	Alfalfa and grain irrigation
Escondido	Crop irrigation
Exeter	Plum irrigation

Table 3.2-2. California Cities Utilizing Recycled Water for Agricultural Purposes (Continued)

City	Agricultural Use
Farmersville	Pasture irrigation
Ferndale	Pasture irrigation
Fresno	Wine grape irrigation, alfalfa and other crop irrigation
Fort Bragg	Vineyard irrigation
Fort Irwin	Crop irrigation
Galt	Pasture irrigation
Gilroy	Flower and vegetable seeds
Guadalupe	Pasture irrigation
Hemet	Food crop irrigation
Indio	Crop and fodder irrigation
Jamestown	Crop irrigation, pasture irrigation
Lake Arrowhead	Crop irrigation
Lakeport	Pasture irrigation
Lake of the Pines	Pasture irrigation
Lincoln	Pasture irrigation
Lodi	Corn irrigation
Lompoc	Corn irrigation
Lucerne Valley	Alfalfa and fodder crop irrigation
Madera	Crop irrigation
City	**Agricultural Use**
Manteca	Orange groves, corn irrigation
McFarland	Grain irrigation
McKinleyville	Pasture irrigation
Mendocino	Pasture irrigation
Montague	Hay, alfalfa irrigation
Morgan Hill	Flower and vegetable seed irrigation
Murphys	Pasture irrigation
Napa	Vineyards irrigation
Palmdale	Crop irrigation
Perris Valley	Crop irrigation
Petaluma	Crop irrigation
Plymouth	Pasture irrigation
Pomona	Strawberry irrigation
Porterville	Alfalfa irrigation
Poway	Crop irrigation
Redding	Pasture irrigation
Riverside	Crop irrigation
San Luis Obispo	Crop irrigation

Table 3.2-2. California Cities Utilizing Recycled Water for Agricultural Purposes (Continued)

City	Agricultural Use
Santa Maria	Pasture irrigation
Santa Rosa	Crop irrigation, vineyards, pasture irrigation
Selma	Wheat irrigation, plum orchard irrigation
Solvang	Pasture irrigation
Sonoma	Crop irrigation, vineyards, blueberry irrigation
South Lake Tahoe	Pasture irrigation
St. Helena	Vineyards
Susanville	Alfalfa irrigation
Taft	Alfalfa irrigation
Temecula	Bean and grain irrigation, potato irrigation, vegetable irrigation
Tulare	Food crop irrigation
Ventura	Food crop irrigation
Wasco	Alfalfa, sugar beet irrigation
Watsonville	Artichokes, lettuce and other food crop irrigation
Whispering Palms	Pasture irrigation
Willits	Crop irrigation
Windsor	Crop irrigation, vineyards

Source: Redwood City Public Works Services Department

Note: Rows shaded in gray indicate cities for which recycled water is used for vineyards.

The City of Santa Rosa is the managing partner of the Santa Rosa Subregional Reclamation System, which recycles water and distributes it on behalf of the cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol, and portions of the unincorporated area of Sonoma County. More than 50 percent of this recycled water (approximately 4 billion gallons annually) is used to irrigate approximately 5,700 acres of farmlands, including pastures, hay crops, vineyards, and row crops. The Santa Rosa Subregional Reclamation System is one of the largest recycled water agricultural irrigation systems in the country.

Recycled Water for Food Crops

The Monterey Regional Water Pollution Control Agency (MRWPCA), which has extensive experience in recycled water projects for agricultural reuse, conducted pathogen studies prior to authorization of tertiary treated water application to crops. MRWPCA's study ultimately demonstrated that recycled water is as safe as well water when used to irrigate food crops. Released in 1987, the study showed no contamination from the pathogens tested, which included viruses and fecal coliform, when recycled water was used on a variety of food crops common to the region, including artichokes, lettuce, broccoli, and cauliflower. Based on the findings of the study, state and local agencies approved the MRWPCA's use of tertiary treated water on food crops.

The MRWPCA continues to work with the Salinas Valley growers to ensure that the tertiary treated water is suitable for agriculture. Because the recycled water contains salts, the MRWPCA periodically tests soil salinity at farms that are using its tertiary treated water. (Environmental Expert, 2001)

Though irrigation amounts and frequency and application vary from grape variety to grape variety, no studies demonstrate that irrigation practices with recycled water affect different grape varieties differently.

Use of Recycled Water and Soil Salinity

Recycled water generally has a higher concentration of dissolved salts than drinking water. Water with high levels of salts can have adverse effects on plant health and appearance; however, most recycled water produced does not have harmful levels of salts for most plants. The threshold for soil salinities for grapes is 1.5 millimhos per centimeter (mmhos/cm). See Section 3.8, Hydrology, Impact HWQ-4, for a discussion of minor increases in salinity of groundwater as a result of agricultural irrigation.

Crop Toxicity (Chloride, Sodium, and Boron)

Grape production can be directly affected by toxicity due to specific ions. Grapes are sensitive to chloride and to some degree sodium in the irrigation water and can develop injury to leaves if concentrations exceed certain levels. Although boron is an essential element required for plant growth, it can be potentially toxic to the plant if concentrations become too high. Discussion of toxicity issues with regards to NSCARP irrigation are covered in Section 3.12, Public Health and Safety and Impact PUB-7. Chemical constituent summaries from the water treatment plants being used as NSCARP water sources are covered in Tables 3.8-2 and 3.8-3.

Organic Farming

Current federal standards for "Organic" foods do not address use of recycled water for irrigation purposes, so by default organic farmers may use tertiary water and retain their organic certification. However, the California Certified Organic Farmers decided in 2000 that recycled water could only be applied to the non-edible portions of food crops. For example, drip irrigation of vineyards would be acceptable, but sprinkler application of tertiary water on edible crops would not be acceptable. (Community Clean Water Institute, 2006)

As identified under C.F.R. § 205.605 products may retain organic certification and be labeled “organic” or “made with organic (specified ingredients or food groups)” when using water that does not exceed the maximum disinfectant limit under the Safe Drinking Water Act (National Organic Program, 2003). This limit is currently established by the U.S. Environmental Protection Agency at four milligrams of chlorine per liter of water. At the City of Santa Rosa Subregional Reclamation System Laguna Plant, the mean concentration of chlorine (0.11 mg/L) in the Plant’s effluent is similar to that found in the drinking water supplied by public water systems in the area that use chlorine for disinfection (City of Santa Rosa, 2003).

Water Application for Frost Protection

When soils are dry, there are more air spaces in the soils, which inhibit the transfer of heat into the soils and the storage of heat by soils during the day. Therefore, in dry years, frost protection is improved by wetting dry soils. The goal is to maintain the soil water content near field capacity, which is typically the water content one to three days following thorough wetting. It is unnecessary to wet the soil deeply because most of the daily heat-transfer and storage occurs in the top 30 cm. Wetting the soil will often make it darker, and increases absorption of solar radiation. However, when the surface is wet, then evaporation is also increased and the energy losses to evaporation tend to counterbalance the benefits from better radiation absorption. It is best to wet dry soils well in advance of the frost event, so that the sun can warm the soil.

Low temperatures have the potential to cause significant damage to grapevines in many grape-growing regions. Cold injury to grapevines may result from the winter minimum temperature; spring temperatures below 31°F (-0.6°C), which may damage developing buds; or fall temperatures below 31°F (-0.6°C), which may injure maturing canes and berries. Efforts to minimize damage from spring freeze events can be divided into passive and active methods. Passive methods involve site selection, variety selection, and cultural practices, while active methods, such as the use of heaters and/or sprinklers, involve modification of the vineyard climate. The effectiveness of frost protection methods is dependent on the characteristics of the freezing event.

Glassy-winged Sharpshooter

Pierce’s disease is caused by the bacterium (Xylella fastidiosa), which blocks the water-conducting vessels of plants. This incurable plant disease causes leaves to appear dry or scorched. Vines can die within one to two years of being infected by the bacterium. Once the plant is infected with Pierce’s disease, the plant acts as a reservoir of bacterium (University of California, Riverside, 2002).

The primary vector of Pierce’s disease is the GWSS. When a sharpshooter feeds on the infected plant, the sharpshooter acquires the bacterium and is capable of transmitting the disease to healthy plants while feeding.

There is a growing concern that the GWSS will spread throughout the state. Because there is no practical cure for Pierce’s disease, aggressive approaches have been taken to address and research the disease.

3.2.9 Regulatory Setting

California Land Conservation Act

Under the provisions of the Williamson Act (California Land Conservation Act 1965, Section 51200), landowners contract with the County to maintain agricultural or open space use of their lands in return for reduced property tax assessment. The contract is self-renewing and the landowner may notify the County at any time of intent to withdraw the land from its preserve status. Withdraw involves a ten-year period of tax adjustment to full market value before protected open space can be converted to urban uses. Consequently, land under the Williamson Act Contract can be in either a renewal status or a nonrenewable status. Lands with a nonrenewable status indicate the farmer has withdrawn from the Williamson Act Contract and is waiting for a period of tax adjustment for the land to reach its full market value. Nonrenewable lands are candidates for potential urbanization within the next ten years (California Department of Conservation, 2000).

After the landowner has filed the non-renewal, the landowner may petition to the County for early cancellation of the contract. The Board of Supervisors may grant tentative approval for cancellation only if it makes one of the following findings:

- The cancellation is consistent with the purposes of the Williamson Act; or
- The cancellation is in the public interest (Government Code Section 51282(a).

In order to find that cancellation is consistent with the purposes of the Williamson Act, the Board of Supervisors must find the following:

- A notice of non-renewal has been filed;
- Cancellation of the contract would not likely result in the removal of adjacent lands from agricultural use;
- Cancellation of the contract would result in an alternative use which is consistent with provisions of the applicable General Plan;
- Discontinuous patterns of urban development would not result from cancellation; and,
- There is no proximate non-contracted land that is both available and suitable for the proposed use, or that development of contracted land would provide more contiguous patterns of urban development.

In order to find that cancellation is in the public interest, the Board of Supervisors must find that:

- Public concerns substantially outweigh Williamson Act objectives;
- There is no proximate non-contracted land that is both available and suitable for the proposed use; or
- Development of contracted land would provide more contiguous patterns of urban development.

Farmland Mapping and Monitoring Program

The California Department of Conservation, under the Division of Land Resource Protection, has established the Farmland Mapping and Monitoring Program (FMMP), which monitors the conversion of the state's farmland to and from agricultural use. The map series identifies eight classifications and uses a minimum mapping unit size of 10 acres. The program also produces a biannual report on the amount of land converted from agricultural to non-agricultural use. The program maintains an inventory of state agricultural land and updates its "Important Farmland

Series Maps" every two years. The FMMP is an informational service only and does not constitute state regulation of local land use decisions (California Department of Conservation, 2000). Four categories of farmland: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance, are considered valuable and any conversion of land within these categories is typically considered to be an adverse impact.

Local Jurisdiction Regulation

The Sonoma County General Plan, Agricultural Resources Element acknowledges the importance of agricultural production in the County and promotes and enhances highly efficient and economic opportunities for agricultural advancement. The Agricultural Resources Element identifies several goals, objectives, and policies intended to promote, encourage, and maintain agricultural production in the County. Agricultural Resources goals, objectives, and policies applicable to the NSCARP are listed in Table 3.9-1, which provides a summary assessment of the NSCARP's consistency with each goal, objective, and policy identified.

3.2.10 Methodology

Loss of Farmland

Loss of farmland refers to the conversion of status farmland as defined earlier in this section into non-agricultural uses. For the purposes of this EIR/EIS, this conversion would be primarily from farmland to NSCARP components (such as, pump stations and/or reservoirs).

This impact analysis is based on a review of relevant literature. The *Important Farmland Series Maps for Sonoma County* (mapped at a scale of 1:24,000) supplied by the Department of Conservation, Office of Land Conservation, Farmland Mapping and Monitoring Program (Department of Conservation, 2002a) was used to evaluate the potential for impacts to status farmland impacted by the construction and installation of NSCARP facilities.

Conflict with Williamson Act Contracts

Proposed pipelines would be installed under project area roadways and underground in adjacent farmlands, while pump stations could be located adjacent to project area roadways or on existing farmland. Proposed and expanded reservoirs would be located on existing farmland and would be consistent with existing uses, but construction of new or expanded reservoirs may require the acquisition of lands subject to Williamson Act Contracts, which may require amendments to the Contract or cancellation of the Contract.

GWSS Threat to Vineyards

For the purpose of analysis in this EIR/EIS, it was assumed that the greatest risk for introduction of the GWSS would be from the introduction of vegetation from outside the area that could harbor sharpshooter eggs. Therefore the analysis addresses the risk of introduction of such vegetation through NSCARP activities.

3.2.11 CEQA Thresholds of Significance Criteria

The evaluation criteria for Agricultural Resources impacts are presented in Table 3.2-3. These criteria are drawn from CEQA requirements and supplemented with applicable goals, objectives and policies from the Sonoma County General Plan. Agricultural resources impacts would be considered significant if the project converted farmland to non-agricultural uses, resulted in reduced soil productivity, or cause damage to adjacent vineyards resulting from the potential introduction of the GWSS.

Table 3.2-3. CEQA Evaluation Criteria/Thresholds of Significance Criteria

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will implementation of the NSCARP result in loss of Farmland?	Acres of status farmland lost.	Greater than 0 acres	CEQA Guidelines Appendix G, Checklist Item II(a)
2. Will the NSCARP cause conflict with the Williamson Act contracts?	Acres of land that would be removed from Williamson Act contracts as a result of the NSCARP.	Greater than 0 acres	CEQA Guidelines Appendix G, Checklist Item II(b) California Land Conservation Act of 1965
3. Will the NSCARP reduce agricultural soil productivity as a result of erosion of topsoil from the application of recycled water?	Acres of soils resulting in topsoil erosion that have been irrigated by recycled water and are not subject to erosion control plans under the Sonoma County Vineyard Erosion and Sediment Control Ordinance or the California Forest Practice Rules.	Greater than 0 acres	CEQA Guidelines Appendix G, Checklist Item II(c) Sonoma County Vineyard Erosion and Sediment Control Ordinance. California Forest Practice Rules (California Department of Forestry and Fire Protection, 2003).
4. Will the NSCARP reduce agricultural soil productivity due to build-up of trace elements or salinity?	a) Suitability of recycled water for irrigation (pH units, mh/l, mmhos/cm) b) Metals loading (kilograms/hectare) in soils from application of recycled water and fertilizer/manure.	Exceedances of United Nations Food and Agricultural Organization (FAO) Irrigation Water Guidelines. Exceedance of state guidelines or federal rules.	CEQA Guidelines Appendix G, Checklist Item II(c) United Nations FAO Irrigation Water Guidelines (FAO, 1994), Government of Canada, Prairie Farm Rehabilitation Administration, Irrigation and Salinity (Canada 2000). CEQA Guidelines Appendix G, Checklist Item II(c) State Water Resources Control Board Report #84-1 (Pettygrove G.S. and Asano, T. 1996) EPA 503 Rules for applications of sludge.
5. Will the NSCARP cause damage to adjacent vineyards by increasing GWSS populations?	Plants not locally grown or purchased from nurseries with approved inspection programs.	Greater than 0 plants.	CEQA Guidelines Appendix G, Checklist Item II(c) Sonoma County Agricultural Commissioner Sonoma County Viticulture Advisor

3.2.12 Alternatives Analysis

Alternative 1 (No Project/Action)

Under the No Project Alternative the NSCARP would not be built. As such, the potential adverse impacts associated with loss of Farmland, conflicts with Williamson Act Contracts, soil productivity, and introduction of GWSS would not occur under the No Project Alternative. Implementation of this Alternative would result in a continuation of existing irrigation practices, and no changes would occur to existing agricultural uses within the project area; therefore, conditions under this alternative would be identical to those under existing conditions.

Because the No Project Alternative would result in no change to existing agricultural uses, there would be no impact to agricultural resources. The No Project Alternative, however, would not meet the goals and objectives of NSCARP.

Alternative 2 (Entire NSCARP)

Impact AG-1: The NSCARP could result in loss of Farmland.

Discussion: Pipelines would typically follow public rights-of-way or private roads, but may traverse private lands. Pipelines routed under private lands have the potential to temporarily disrupt agricultural lands. The SCWA would coordinate pipeline installation activities with the grower to ensure minimal conflicts with farming activities. After construction, private property landowners would be allowed to continue growing crops above the pipeline alignment with the understanding that maintenance activities may require the removal of crops/vegetation above the pipeline alignment. The NSCARP would not require the permanent removal of crops associated with pipeline installation, therefore, impacts associated with loss of Farmland resulting from pipeline installation are considered less than significant.

Table 3.2-4 indicates acreages of status Farmland that would be impacted as a result of construction and operation of pump stations and reservoirs associated with NSCARP (see Appendix D for detailed status farmland mapping).

Table 3.2-4. Acres of Status Farmland Impacted by the NSCARP

Project Feature	Region	Farmland Type	Acreage Impacted
Reservoirs			
Bilbro-Biocca Reservoir	Northern Alexander Valley	Grazing Land	32.77
		Other Land	15.47
Todd Reservoir	Northern Alexander Valley	Grazing Land	7.03
		Other Land	3.31
Klein Foods Reservoir	Northern Alexander Valley	Grazing Land	12.28
		Other Land	9.60
Reservoir A	Alexander Valley	Grazing Land	24.79

Table 3.2-4. Acres of Status Farmland Impacted by the NSCARP (Continued)

Project Feature	Region	Farmland Type	Acreage Impacted
		Unique Farmland	1.59
Reservoir C	Alexander Valley	Grazing Land	21.98
		Unique Farmland	1.93
Lytton Reservoir	Alexander Valley	Other Land	45.84
Robert Young Home Ranch Reservoir	Alexander Valley	Grazing Land	10.64
		Unique Farmland	0.38
Existing T-Bar-T Reservoir	Alexander Valley	Grazing Land	10.50
		Unique Farmland	5.25
T-Bar-T #1	Alexander Valley	Grazing Land	11.50
Passalacqua Reservoir	Dry Creek Valley	Grazing Land	29.35
		Unique Farmland	15.61
Kuimelis #1 Reservoir	Dry Creek Valley	Grazing Land	18.18
Kuimleis #2 Reservoir	Dry Creek Valley	Grazing Land	13.16
Russell-Bucher Reservoir	Russian River Valley	Grazing Land	15.39
Bucher Reservoir	Russian River Valley	Grazing Land	10.17
Becnel #2 Reservoir	Russian River Valley	Grazing Land	13.40
JWine Reservoir	Russian River Valley	Prime Farmland	0.75
		Unique Farmland	2.91
		Local Importance	7.81
		Statewide Importance	0.14
Denner Ranch	Russian River Valley	Local Importance	3.49
		Statewide Importance	2.06
Distribution Pump Stations			
Two distribution pump stations	Northern Alexander Valley	Grazing Land	0.12
One distribution pump station	Alexander Valley	Other Land	0.06
Two distribution pump stations	Dry Creek Valley	Grazing Land	0.09
		Unique Farmland	0.03
Distribution Pump Stations			
Three distribution pump stations	Russian River Valley	Grazing Land	0.12
		Local Importance	0.06
Booster Pump Stations			
Three booster pump stations	Northern Alexander Valley	Grazing Land	0.03
Two booster pump stations	Alexander Valley	Prime Farmland	0.01

Table 3.2-4. Acres of Status Farmland Impacted by the NSCARP (Continued)

Project Feature	Region	Farmland Type	Acreage Impacted
Grazing Land			0.01
Two booster pump stations	Dry Creek Valley	Grazing Land	0.02
One booster pump station	Russian River Valley	Grazing Land	0.01
		Total Impacted Acreages Prime Farmland:	0.76
		Total Impacted Acreages Statewide Importance:	2.20
		Total Impacted Acreages Local Importance:	11.36
		Total Impacted Acreages Unique Farmland:	27.70
		Total Impacted Acreages Grazing Land:	231.53
		Total Impacted Acreages Other Land:	74.28

Source: Padre Associates, 2006

As shown in Table 3.2-4, the NSCARP would result in the permanent loss of 0.76 acres of Prime Farmland, 2.20 acres of Farmland of Statewide Importance, 11.36 acres of Farmland of Local Importance, 27.70 acres of Unique Farmland, 231.53 acres of Grazing Land, and 74.28 acres of Other Land.

As shown in Table 3.2-4, pump stations and expanded and proposed reservoirs constructed on status Farmland would result in a permanent loss of Farmland. Sonoma County Zoning Regulations Article 12 Section 26-12-020(u) states that agricultural lands within Agricultural Preserves may contain “minor public service uses or facilities (transmission and distribution lines and telecommunication facilities excepted), including but not limited to reservoirs, storage tanks, pumping stations . . .” with a use permit; however, the permanent loss of status Farmland resulting from pump station and reservoir construction is considered a significant impact.

In addition to the potentially significant impacts identified with the permanent placement of NSCARP components on status Farmland, construction activities would result in a temporary site disturbance from construction roads, equipment storage and operation, and/or potential topsoil stockpiling. However, this disturbance would be short-term, and there would be no permanent loss of Farmland due to construction activities.

Impact Category: Significant and Unavoidable

CEQA Threshold of Significance Criterion: 1

Mitigation Measure AG-1: The SCWA shall site project components to avoid status Farmland and lands subject to Williamson Act Contracts, to the extent feasible.

If project components cannot feasibly be located outside of lands designated as status Farmland or lands subject to Williamson Act Contracts, landowners would be compensated for the fair market value of lands acquired and for any applicable

Williamson Act contract cancellation fees. Table 3.2-5 shows lands within the project area that are under Williamson Act Contracts and would require modifications to existing lands (i.e., development or expansion of reservoirs, placement of underground pipeline, or pump station development).

No additional mitigation has been identified that would serve to reduce the loss of status Farmland to a less than significant level and, therefore, the NSCARP would result in a significant and unavoidable impact associated with the permanent loss of status Farmland and lands subject to Williamson Act Contracts.

Impact after Mitigation: Significant and Unavoidable. Implementation of Mitigation Measure AG-1 would reduce impacts to status Farmland to the extent feasible; however, any conversion as part of placement of reservoirs or pump stations would represent a significant and unavoidable impact due to the permanent loss of these lands for their intended purpose.

Impact AG-2: The NSCARP would have the potential to conflict with existing Williamson Act Contracts.

Discussion: Pipelines would typically follow public rights-of-way or private roads, but may traverse private lands. Pipelines routed under private lands have the potential to temporarily disrupt agricultural lands subject to Williamson Act Contracts. The SCWA would coordinate pipeline installation activities with the grower to ensure minimal conflicts with farming activities. After construction, private property landowners would be allowed to continue growing crops above the pipeline alignment with the understanding that maintenance activities may require the removal of plants above the pipeline alignment. The NSCARP would not require the permanent removal of crops associated with pipeline installation, therefore, impacts associated with loss of lands subject to Williamson Act Contracts resulting from pipeline installation are considered less than significant.

Pump stations and reservoirs would be constructed on lands subject to Williamson Act Contracts. Pump stations and expanded and proposed reservoirs constructed on lands subject to Williamson Act Contracts would potentially result in a conflict with the Contracts. Table 3.2-5 shows lands within the project area that are under Williamson Act Contracts and would require modifications to existing lands (i.e., development or expansion of reservoirs, placement of underground pipeline, or pump station development). The potential conflict with the applicable Williamson Act Contracts resulting from pump station and reservoir construction is considered a significant impact.

Table 3.2-5. Parcels within the Project Area under Williamson Act Contract

Assessor's Parcel Number	Parcel Size (in acres)	Assessor's Parcel Number	Parcel Size (in acres)
057-080-008	0.97	117-270-014	27.12
057-080-010	1.02	118-040-016	28.46
057-080-015	136.12	118-050-013	211.56
057-080-026	336.83	118-060-007	10.12

Table 3.2-5. Parcels within the Project Area under Williamson Act Contract (Continued)

Assessor's Parcel Number	Parcel Size (in acres)	Assessor's Parcel Number	Parcel Size (in acres)
066-300-054	68.08	118-060-007	26.09
066-310-029	0.87	118-060-009	34.64
066-310-030	135.20	118-060-009	10.64
091-010-014	118.82	118-110-005	152.32
091-010-017	27.15	131-040-021	432.91
091-020-018	10.97	131-050-004	305.93
091-081-001	36.77	131-110-002	94.83
110-110-001	45.38	131-110-004	96.74
110-110-021	130.03	131-110-009	25.46
110-110-022	58.13	131-160-002	29.66
110-150-001	122.36	131-160-031	41.48
110-150-019	65.61	131-160-032	14.42
110-150-020	158.10	131-190-022	15.60
110-180-002	162.08	131-210-030	22.47
110-180-031	220.12	131-240-008	57.52
110-180-036	353.47	140-010-006	77.61
110-180-039	213.55	140-010-009	33.40
110-180-040	82.79	140-010-016	15.91
110-200-002	620.51	140-010-019	14.79
110-200-004	643.60	140-010-024	25.62
110-230-016	0.63	140-010-025	41.24
110-230-024	13.38	140-020-016	22.19
110-260-043	69.82	140-040-004	24.61
110-260-045	194.65	140-040-007	118.86
110-260-047	78.62	140-050-002	55.22
110-260-055	77.78	140-060-004	80.22
110-260-059	96.60	140-060-006	32.81
116-280-016	39.76	140-190-021	59.17
117-060-046	17.23	141-180-027	48.32
117-070-016	57.54	141-180-029	32.56
117-110-042	186.71	141-190-026	131.53
		140-010-025	41.24

Source: Sonoma County, Permit Resource & Management Department, 2005

In addition to the potentially significant impacts identified with the permanent placement of NSCARP components on Williamson Act Contract lands, construction activities would result in a temporary site disturbance from construction roads, equipment storage and operation, and/or potential topsoil stockpiling. However, this disturbance would be short-term, and there would be no permanent loss of Williamson Act Contract lands due to construction activities.

Compensation for permanent easements for development of proposed reservoirs and pump stations on private lands may result in cancellation of the applicable Williamson Act Contract, as the land would be in public facility use. Cancellation of Williamson Act contract status may be consistent with Williamson Act provisions, but cannot be determined until ultimate project design is complete. Depending on ownership patterns, acquisition of land may also disqualify remaining parcels from continued participation under the Williamson Act if the remainder is smaller than the minimum parcel size under Williamson Act statutes.

As discussed above, this impact is considered significant. SCWA would implement Mitigation Measure AG-1; however, no additional mitigation has been identified that would serve to reduce the loss of lands subject to Williamson Act Contracts to a less than significant level and, therefore, the NSCARP would result in a significant and unavoidable impact associated with the permanent loss of lands subject to Williamson Act Contracts.

Impact Category: Significant and Unavoidable

CEQA Threshold of Significance Criterion: 2

Mitigation Measure AG-2: Implement Mitigation Measure AG-1.

Impact after Mitigation: Significant and Unavoidable. Implementation of Mitigation Measure AG-1 would reduce impacts to Williamson Act contracts to the extent feasible; however, any conversion as part of placement of reservoirs or pump stations would represent a significant and unavoidable impact due to the permanent loss of these lands for their intended purpose.

Impact AG-3: The NSCARP would have the potential to reduce soil productivity resulting from topsoil erosion due to application of recycled water.

Discussion: Soil erosion generally results when water applied exceeds either soil infiltration rates or the water requirements of the crop. Substantial soil erosion would likely adversely affect agricultural productivity. Water supplied by the NSCARP would be used to irrigate farmland. Because the NSCARP would provide an alternative source of irrigation water to the project area and would not increase the amount of irrigated lands, this impact is considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 3

Mitigation Measure: None required

Impact AG-4: The NSCARP would have the potential to reduce soil productivity due to build-up of trace elements or salinity.

Discussion: Trace elements are required by plants in low concentrations. However, higher concentrations may be toxic to the plants. Scientists have determined that the following 15 elements are essential for crop growth: boron (B), calcium (Ca), carbon (C), chlorine (Cl), copper (Cu), hydrogen (H), iron (Fe), manganese (Mn), molybdenum (Mo), nitrogen (N), oxygen (O), phosphorus (P), potassium (K), sulfur (S), and zinc (Zn).

Recycled water quality data collected in conjunction with the preparation of the City of Santa Rosa Incremental Recycled Water Program EIR in 2002 was utilized for this analysis. Though the data included in Table 3.2-6 is specific to the Santa Rosa Facility, the ALWSZ Facility, and the Windsor Wastewater Treatment Facility are required to comply with state, federal and international wastewater standards. Table 3.2-6 compares recycled water quality data collected for the Laguna Subregional Water Reclamation Facility, the ALWSZ, and Windsor with FAO Guidelines for irrigation suitability. Subregional System water quality did not exceed any of the guidelines for salinity (see Table 3.2-6). Due to the differences in sampling between the three facilities, some constituents may not be shown. For the entire sampling range for the ALWSZ and Windsor facilities see Section 3.8, Table 3.8-3. The recycled water quality is in mg/L unless otherwise noted.

Table 3.2-6. Water Quality Data Collected Compared to United Nations Food and Agricultural Organization Irrigation Water Guidelines

Constituent	Laguna Facility (Santa Rosa)	ALWSZ	Windsor	FAO Irrigation Water Guidelines (mg/L unless otherwise noted)
pH	7.4 pH	7.8	7.7	6.5-8.4 pH
Total Dissolved Solids (TDS)	432	442	420	450-1000
Salinity	0.71 mmhos/cm	--	--	0.5-0.8 mmhos/cm
Sodium	72.3	67.4	100	70-80
Chloride	64.3	123	90	140-200
Boron	0.47	--	--	<1.5
Nitrate	7.6	7.3	30	5-30
Arsenic	0.002	--	--	0.1
Cadmium	0.002	--	--	0.01
Chromium	0.009	--	--	0.1
Copper	0.009	--	--	0.2
Lead	0.002	--	--	5.0
Nickel	0.003	--	--	0.2
Selenium	0.002	--	--	0.05
Zinc	0.03	--	--	3.0

Source: City of Santa Rosa, 2003
Notes:
1. Merritt Smith Consulting, 2002.
2. United Nations Food and Agricultural Organization Irrigation Water Guidelines, 1994

Due to the low constituent concentrations indicated in Table 3.2-6, accumulation of metals in soil from recycled water application is very low and would not affect long-term soil productivity.

The Napa Sanitation District (NSD) produces tertiary-quality recycled water for reuse, and employs an extensive water reuse program with the goal of promoting the use of recycled water in the community. The NSD is currently proposing to expand the use of recycled water in Napa County. As part of a 2005-2006 study, the University of California Agriculture & Natural Resources Department analyzed the soil salinity levels in Napa Valley vineyards irrigated with NSD recycled water. To determine if long-term irrigation with recycled water resulted in the buildup of soil salinity, soil samples were collected from a vineyard that had been deep-irrigated solely with NSD water for eight seasons (1997-2005). The grower typically applied 75 to 100 gallons of recycled water per vine per season. Soil samples were collected late in the growing season (i.e., September) but before the winter rains occurred, so the sampling event represented maximum soil salinity in the field over the season. The maximum soil salinity sample value was 0.79 mmhos/cm, and most samples were between 0.25 and 0.5 mmhos/cm, well below the 1.5 mmhos/cm grape soil salinity threshold. The data did not indicate a trend with respect to depth or distance from the irrigation dripline (University of California, 2006). Based on the data from the University of California study, a significant increase in soil salinity due to recycled water application is not anticipated.

The SCWA would not provide water for irrigation that does not meet Title 22 requirements and FAO Guidelines. Furthermore, because the wastewater treatment facilities are required to comply with state, federal and international wastewater standards, this impact is considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 4

Mitigation Measure: None required

Impact AG-5: The NSCARP would have the potential to introduce glassy-winged sharpshooters (*Homalodisca coagulate*) to the project area.

Discussion: The glassy-winged sharpshooter is a large leafhopper that feeds on the water-conducting tissues of a plant. GWSS can spread Pierce's disease by acquiring the disease-causing bacterium *Xylella fastidiosa* from infected plants and transmitting it to healthy plants while feeding (UC IPM, 2001).

Construction activities would result in bare, disturbed lands adjacent to project area roadways and through and within established vineyards. Disturbed lands would be revegetated to maintain a viewshed similar to pre-construction conditions. Revegetation efforts would have the potential to introduce GWSS to the project area. Implementation of Mitigation Measure AG-5 would ensure the GWSS would not be introduced into the project area by revegetation activities of the NSCARP.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 5

Mitigation Measure AG-5: Plants acquired for landscaping and revegetation purposes shall be purchased from locally grown stock or from a nursery that has an approved monitoring program for the GWSS.

Impact after Mitigation: Less than Significant. With the incorporation of mitigation, impacts would be less than significant.

Alternative 3 (Alexander Valley-Jordan Reservoir Subset)

The study area for the agricultural resources analysis is located in the same region as Alternative 2; however, is smaller in scale. Project design for Alternative 3 would be similar to Alternative 2. Like Alternative 2, pipeline installation, proposed expansion to existing reservoirs and proposed construction of new reservoirs, as well as installation of pump stations associated with Alternative 3 would result in impacts to status Farmland and parcels under Williamson Act Contracts. Table 3.2-7 indicates acreages of status Farmland that would be impacted as a result of construction and operation of pump stations and reservoirs associated with Alternative 3 (see Appendix D for detailed status farmland mapping).

Table 3.2-7. Acres of Status Farmland Impacted by Alternative 3

Project Feature	Region	Farmland Type	Acreage Impacted
Reservoirs			
Reservoir A	Alexander Valley	Grazing Land	24.79
		Unique Farmland	1.59
Reservoir C	Alexander Valley	Grazing Land	21.98
		Unique Farmland	1.93
Booster Pump Stations			
One booster pump station	Alexander Valley	Grazing Land	0.01
Total Impacted Acreages Unique Farmland:			3.52
Total Impacted Acreages Grazing Land:			46.78

Source: Padre Associates, 2006

As shown in Table 3.2-7, Alternative 3 would result in the permanent loss of 3.52 acres of Unique Farmland and 46.78 acres of Grazing Land. Permanent loss of status Farmland resulting from Alternative 3 construction and operation is considered a significant impact. Like Alternative 2, Mitigation Measure AG-1 would be implemented for Alternative 3; however, even with implementation of Mitigation Measure AG-1, Alternative 3 would result in a significant and unavoidable impact associated with the permanent loss of status Farmland and lands subject to Williamson Act Contracts.

Similar to Alternative 2, Alternative 3 would result in the construction of pump stations and reservoirs on lands subject to Williamson Act Contracts. Pump stations and expanded and proposed reservoirs constructed on lands subject to Williamson Act Contracts would potentially result in a conflict with the Contracts. Table 3.2-8 shows lands within the Alternative 3 area that are under Williamson Act Contracts and would require modifications to existing lands (i.e., development or expansion of reservoirs, placement of underground pipeline, or pump station development). The potential conflict with the applicable Williamson Act Contracts resulting from pump station and reservoir construction is considered a significant impact. As discussed above, Mitigation Measure AG-1 would be implemented for Alternative 3; however, even with implementation of Mitigation Measure AG-1, Alternative 3 would result in a significant and unavoidable impact associated with the permanent loss of status Farmland and lands subject to Williamson Act Contracts.

Table 3.2-8. Parcels within Alternative 3 (Alexander Valley-Jordan Reservoir Subset) under Williamson Act Contract

Assessor's Parcel Number	Parcel Size (in acres)	Assessor's Parcel Number	Parcel Size (in acres)
091-010-014	118.82	131-240-008	57.52
091-010-017	27.15	140-010-006	77.61
091-020-018	10.97	140-010-009	33.40
091-081-001	36.77	140-010-016	15.91
131-040-021	432.91	140-010-019	14.79
131-050-004	305.93	140-010-024	25.62
131-110-002	94.83	140-010-025	41.24
131-110-004	96.74	140-020-016	22.19
131-110-009	25.46	140-040-004	24.61
131-160-002	29.66	140-040-007	118.86
131-160-031	41.48	140-050-002	55.22
131-160-032	14.42	140-060-004	80.22
131-190-022	15.60	140-060-006	32.81
131-210-030	22.47		

Source: Sonoma County, Permit Resource & Management Department, 2005

Alternative 3 would result in soil productivity impacts similar to those discussed for Alternative 2. Like Alternative 2, landscaping activities associated with Alternative 3 have the potential to introduce the GWSS to the Alternative 3 area. This is considered a significant impact. Implementation of Mitigation Measure AG-5 would reduce this impact to less than significant.

Alternative 4 (Russian River Valley-Westside Subset)

The study area for the agricultural resources analysis is located in the same region as Alternative 2, however, is smaller in scale. Project design for Alternative 4 would be similar to Alternative 2. Like Alternative 2, pipeline installation, proposed expansion to existing reservoirs and proposed construction of new reservoirs, as well as installation of pump stations associated with Alternative 4 would result in impacts to status Farmland and parcels under Williamson Act Contracts. Table 3.2-9 indicates acreages of status Farmland that would be impacted as a result of construction and operation of pump stations and reservoirs associated with Alternative 4 (see Appendix D for detailed status farmland mapping).

Table 3.2-9. Acres of Status Farmland Impacted by Alternative 4

Project Feature	Region	Farmland Type	Acreage Impacted
Reservoirs			
Russell-Bucher Reservoir	Russian River Valley	Grazing Land	15.39
Bucher Reservoir	Russian River Valley	Grazing Land	10.17
Becnel #2 Reservoir	Russian River Valley	Grazing Land	13.40
Distribution Pump Stations			
Two distribution pump stations	Russian River Valley	Grazing Land	0.12
Booster Pump Stations			
One booster pump station	Russian River Valley	Grazing Land	0.01
Total Impacted Acreages Grazing Land:			39.09

Source: Padre Associates, 2006

As shown in Table 3.2-9, Alternative 4 would result in the permanent loss of 39.09 acres of Grazing Land. Permanent loss of status Farmland resulting from Alternative 4 construction and operation is considered a significant impact. Like Alternative 2, Mitigation Measure AG-1 would be implemented for Alternative 4; however, even with implementation of Mitigation Measure AG-1, Alternative 4 would result in a significant and unavoidable impact associated with the permanent loss of status Farmland and lands subject to Williamson Act Contracts.

Similar to Alternative 2, Alternative 4 would result in the construction of pump stations and reservoirs on lands subject to Williamson Act Contracts. Pump stations and expanded and proposed reservoirs constructed on lands subject to Williamson Act Contracts would potentially result in a conflict with the Contracts. Table 3.2-10 shows lands within the Alternative 4 area that are under Williamson Act Contracts and would require modifications to existing lands (i.e., development or expansion of reservoirs, placement of underground pipeline, or pump station development). The potential conflict with the applicable Williamson Act Contracts resulting from pump station and reservoir construction is considered a significant impact. As discussed above, Mitigation Measure AG-1 would be implemented for Alternative 4; however, even with implementation of Mitigation Measure AG-1, Alternative 4 would result in a significant and unavoidable impact associated with the permanent loss of status Farmland and lands subject to Williamson Act Contracts.

Table 3.2-10. Parcels within Alternative 4 (Russian River-Westside Subset) under Williamson Act Contract

Assessor's Parcel Number	Parcel Size (in acres)	Assessor's Parcel Number	Parcel Size (in acres)
057-080-008	0.97	110-180-002	162.08
057-080-010	1.02	110-180-031	220.12
057-080-015	136.12	110-180-036	353.47
057-080-026	336.83	110-180-039	213.55
066-300-054	68.08	110-180-040	82.79
066-310-029	0.87	110-200-002	620.51
066-310-030	135.20	110-200-004	643.60
110-110-001	45.38	110-230-016	0.63
110-110-021	130.03	110-230-024	13.38
110-110-022	58.13		

Source: Sonoma County, Permit Resource & Management Department, 2005

Alternative 4 would result in soil productivity impacts similar to those discussed for Alternative 2. Like Alternative 2, landscaping activities associated with Alternative 4 have the potential to introduce the GWSS to the Alternative 4 area. This is considered a significant impact. Implementation of Mitigation Measure AG-5 would reduce this impact to less than significant.

3.3 AIR QUALITY

3.3.1 Physical Setting

Project Location

NSCARP is located within the North Coast Air Basin (NCAB) and San Francisco Bay Area Air Basin (SFBAAB). The Northern Sonoma County Air Pollution Control District (NSCAPCD) manages air quality for the project area in the NCAB and the Bay Area Air Quality Management District (BAAQMD) manages air quality for the project area in the SFBAAB.

Existing Emissions Sources

Motor vehicles are the primary source of ambient air pollution in the study area. Other local sources of air pollution include industry, residential heating by burning wood and natural gas, and agricultural practices. Small miscellaneous sources such as lawn mowers, coffee roasters, char broilers, dry cleaners, gasoline stations, and many other small business operations also contribute air pollutants. Air pollutant concentrations are affected by both emissions and meteorology. While meteorology tends to create short-term variations in pollutant concentrations, changes in emissions create long-term variations. Topographical and meteorological conditions are important factors in affecting local air pollutant concentrations. Meteorological effects such as wind speed, wind direction and air temperature gradients interact with topographical features to direct the movement and dispersal of air pollutants.

Meteorology

The Pacific Ocean dominates the climate of the Santa Rosa Plain and surrounding areas. Local wind patterns are strongly influenced by the Petaluma Gap. As marine air travels through the Petaluma Gap, it splits into northward and southward paths. In the Santa Rosa area, prevailing winds flow generally from the south about 60 percent of the time. Moderate to strong northwesterly winds blow over 50 percent of the time in summer, and about 30 percent of the time annually. Calm conditions occur about 14 percent of the time in winter, and eight percent of the time annually. In Santa Rosa, the average annual wind speed is five miles per hour. At Cloverdale Peak, (elevation 2,923 feet) average annual wind speed is 7.5 miles per hour, and calm conditions almost never occur. At the Geysers Steamfield, at an elevation of 3,000 feet, the average wind speed is 11.9 miles per hour and calm conditions are non-existent (IRWP, 2003).

Sonoma County is a sub-region of the San Francisco Bay Area. The climate of the Bay Area is determined largely by a high-pressure system that is almost always present over the eastern Pacific Ocean. High-pressure systems are characterized by an upper layer of dry air that warms as it descends, restricting the mobility of cooler marine-influenced air near the ground surface, resulting in subsidence inversions. During summer and fall, locally generated emissions can, under the restraining influences of topography and subsidence inversions, create ozone and secondary particulates, such as nitrates and sulfates. In the winter, the Pacific high pressure system shifts southward, allowing storms to pass through the area. Between storm cycles, inversions often develop, and pollution levels can build up to unhealthful concentrations.

Strong sunlight provides a catalyst for ozone precursor pollutants to react in the atmosphere and form high levels of ground level ozone smog. Thus, highest annual ambient ozone-smog levels typically occur from May to October. In winter, periods of stagnant air (calm or very low wind speeds) can occur, especially between storms. This stagnation can allow respirable particulate levels to build up to unhealthful levels, especially when fireplaces are being heavily used (as at year-end holidays). The PM_{10} data for Santa Rosa show that the highest levels occurred on December 25, 1998, December 26, 1999, and December 20, 2000 (IRWP, 2003).

Temperatures in Sonoma County range from the mid-20s on winter mornings to the low-100s in late summer afternoons. Typically, temperatures range from the 40s in the winter months to the 80s in summer. Coldest weather is typically in January and February, while warmest temperatures generally occur in September and October. Rainfall at lower elevations averages about 30 inches per year and is confined primarily to the wet season from late October to early May. In some mountain areas, rainfall can be over 60 inches per year. Except for occasional light drizzles from thick marine stratus clouds, summers are almost completely dry.

Criteria Air Pollutants

Criteria air pollutants are the selected air contaminants for which State and federal ambient air quality standards have been established to protect public health and welfare: Ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter. The California Air Resources Board (ARB) and local air quality agencies operate air pollutant monitoring stations and report results. These stations measure the ambient concentrations of criteria air pollutants as well as several additional pollutants regulated by the State. Monitored ambient air pollutant concentrations reflect the number and strength of emission sources and the influence of topographical and meteorological factors.

Table 3.3-1 lists the standards, effects, and sources of criteria air pollutants. The ambient air quality standards incorporate a margin of safety and are designed to protect those segments of the public most susceptible to respiratory distress. Sensitive receptors include asthmatics, the very young, the elderly, persons weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

Table 3.3-1. Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	California Standard	Federal Primary Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone (O_3)	1 hour	0.09 ppm	0.12 ppm	Irritation and possibly permanent lung damage.	Motor vehicles, including refining and gasoline delivery.
	8 hours	---	0.08 ppm		
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Deprives body of oxygen in the blood. Causes headaches and worsens respiratory problems.	Primarily gasoline-powered internal combustion engines.
	8 hours	9 ppm	9.0 ppm		

Table 3.3-1. (Continued)

Pollutant	Averaging Time	California Standard	Federal Primary Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Nitrogen Dioxide (NO_2)	Annual Average	---	0.05 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining, power plants, aircraft, ships, and railroads.
	1 hour	0.25 ppm	---		
Sulfur Dioxide (SO_2)	Annual Average	---	0.03 ppm	Irritates and may permanently damage respiratory tract and lungs. Can damage plants, destructive to marble, iron and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	1 hour	0.25 ppm	---		
	24 hours	0.04 ppm	0.14 ppm		
Suspended Particulate Matter (PM_{10}, $PM_{2.5}$)	Annual Geometric Mean	20 µg/m^3 (PM_{10})	15 µg/m^3 ($PM_{2.5}$)	May irritate eyes and respiratory tract, decreases in lung capacity, cancer, and increased mortality. Produces haze and limits visibility.	Industrial and agri-cultural operations, combustion, atmo-spheric photo-chemical reactions, and natural activities (e.g., ocean sprays).
	Annual Geometric Mean	12 µg/m^3 ($PM_{2.5}$)	---		
	Annual Arithmetic Mean	---	50 µg/m^3 (PM_{10})		
	24 hours	50 µg/m^3 (PM_{10})	150 µg/m^3 (PM_{10}) 65 µg/m^3 ($PM_{2.5}$)		
Lead (Pb)	Monthly	1.5 µg/m^3	---	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurologic dysfunctions (in severe cases).	Present source: lead smelters, battery manufacturing and recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 µg/m^3		
Sulfates (SO_4)	24 hours	25 µg/m^3	---	Similar to sulfur dioxide.	Industrial processes, refineries.
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm (1.5 µg/m^3)		Very pungent odor similar to rotten eggs. Annoying and irritating—high concentrations fatal.	Sources include industrial processes, oil production, and geothermal wells.

Source: California Air Resources Board
IRWP, 2003.

Note:
ppm parts per million
µg/m^3 micrograms per cubic meter.

Ozone

Ozone is the most prevalent of a class of photochemical oxidants formed in the urban atmosphere. The creation of ozone is a result of complex chemical reactions between hydrocarbons and oxides of nitrogen in the presence of sunshine. Ozone concentrations tend to be higher in the late spring, summer, and fall, when warm temperatures and long sunny days create conditions conducive to its formation. Unlike other pollutants, ozone is not released directly into the atmosphere from any source. The major sources of oxides of nitrogen and reactive hydrocarbons, known as ozone precursors, are combustion sources such as factories and automobiles, and evaporation of solvents and fuels. The health effects of ozone are eye irritation and damage to lung tissues. Ozone also damages some materials, such as rubber, and may damage plants and crops.

Carbon Monoxide (CO)

CO is essentially inert to plants and materials but can have significant effects on human health. CO is a public health concern because it combines readily with hemoglobin and thus reduces the oxygen-carrying capacity of the blood. Effects on humans range from slight headaches to nausea to death.

Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter that is 10 microns or less in diameter (PM_{10}) is generally small enough to be inhaled and penetrate the lungs. A subset of PM_{10} is particulate matter 2.5 microns or less in diameter ($PM_{2.5}$). Particulate matter consists of solid and liquid particles of dust, soot, aerosols, and other matter small enough to remain suspended in the air for a long period of time. A portion of the particulate matter in the air is due to natural sources, such as wind-blown dust and pollen. Human-made sources include combustion, automobiles, field burning, factories, and road dust. A portion of the particulate matter in the atmosphere is also a result of photochemical processes.

The effects of high concentrations of particulate matter on humans include aggravation of chronic disease and heart/lung disease symptoms. Non-health effects include reduced visibility and soiling of surfaces.

Nitrogen Dioxide (NO2)

Nitrogen dioxide (NO_2) is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_x. Nitrogen dioxide is an acute irritant. A relationship between NO_2 and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. Nitrogen dioxide absorbs blue light and causes a reddish-brown cast to the atmosphere and reduced visibility. It can also contribute to the formation of PM_{10} and acid rain.

Sulfur Dioxide (SO2)

Sulfur dioxide (SO_2) is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high sulfur-content fuel oils and coal and from chemical processes occurring at chemical plants and refineries. In some parts of the State, elevated levels can also be due to natural causes, such as geologic vents and hot springs. SO_2 often combines with water vapor to form sulfuric acid or related acids, resulting in acid rain or fog. SO_2 also can agglomerate with other compounds to form PM.

Lead

Gasoline-powered automobile engines used to be the major source of airborne lead in urban areas. Excessive exposure to lead concentrations can result in gastrointestinal disturbances, anemia, kidney disease, and in severe cases of neuromuscular and neurologic dysfunction. The use of lead additives in motor vehicle fuel has been eliminated in California, and lead concentrations have declined substantially as a result.

Sulfates (SOx)

Sulfates are a type of transformed pollutant. Originating as a gas, such as SO_2, sulfates are a salt of sulfuric acid. They are often found as a fine particulate. Suspended sulfates contribute to overall particulate concentrations in ambient air. Sulfates tend to be acidic and are known to contribute to premature death in individuals with pre-existing respiratory disease. They can also deposit on material surfaces and damage crops, forests, cause rust, decay marble, or mar painted surfaces. A primary local source of sulfates is industrial activities, such as a refinery or coke calciner. A wider-spread source is combustion of diesel fuel containing sulfur. The ARB has regulated sulfur content in diesel fuel to reduce this problem.

Hydrogen Sulfide (H2S)

Hydrogen sulfide is found in nature around some hot springs, geothermal sources, and oil fields (sour gas). It is also produced by anaerobic decomposition, and is sometimes called swamp gas. The human nose can detect H_2S at concentrations well below toxic levels. Heavier than air, this gas is considered obnoxious and unpleasant. At higher levels, it de-sensitizes the nose, and can be fatal because it blocks oxygen uptake by the blood. Mainly a health threat to industrial workers, hydrogen sulfide is usually regulated to eliminate nuisance for nearby residents or property owners.

Toxic Air Contaminants

Toxic Air Contaminants (TAC) are a large group of compounds known to cause cancer or acute health effects. They are generally less pervasive in the urban atmosphere than the criteria pollutants, but they are linked to short-term (acute) or long-term (chronic) adverse health effects. A few, such as diesel exhaust, are common in urban areas and near major highways. The current list of toxic air contaminants includes approximately 200 compounds. According to the BAAQMD, diesel combustion emissions are the TAC responsible for most excess cancer deaths in the Bay Area. TAC sources include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and some agricultural activities. Unlike regulations concerning criteria air pollutants, there are no ambient air quality standards for evaluation of TACs based on the amount of emissions. Instead, TAC emissions are evaluated based on the degree of health risk that could result from exposure to these pollutants.

The State requires the local air districts to quantify and prioritize emissions from individual facilities. High priority facilities must then perform a health risk assessment, and if specific thresholds are violated, they are required to communicate the results to the public in the form of notices and public meetings. Depending on the risk level, emitting facilities can be required to implement varying levels of risk reduction measures. Mobile sources, such as diesel truck and locomotive engines, are not required to perform risk assessments, but are coming under increasing scrutiny as they contribute twice as much to the toxic burden as all other stationary sources combined (BAAQMD 2000 TAC Control Program Report). Consequently, ARB has issued regulations for cleaner diesel fuels and catalytic oxidizer technology.

According to the BAAQMD, control programs have significantly reduced many types of TACs by 60 percent or more. The BAAQMD's 1999 Annual TAC Control Report presents a population-based estimate of excess cancer deaths. This estimate is stated as excess cancer deaths per one million people. For stationary sources, the estimate is 186 excess deaths per one million Bay Area residents. For diesel exhaust, the risk is approximately 450 deaths per one million residents.

The ARB Air Toxics Section has conducted modeling of excess cancer deaths due to inhaled TACs for most urban areas of the State. Much of Northern Sonoma County, with the exception of portions of the NSCARP area, has not been modeled. However, much of the Russian River and Dry Creek Valley NSCARP sub-areas have been modeled. For the areas that have been modeled, combined risk from all sources is estimated at less than 250 excess annual cancer deaths per million people. The Northern Sonoma County air pollution control agencies implement all ARB-recommended control measures to reduce TACs.

Existing Pollution Levels

Air quality in Sonoma County is generally very good due to the rural nature of the region and the almost persistent flow of maritime air across the region. There are infrequent exceedances of health-based air quality standards for ozone and fine particulate matter.

Measured Pollutant Concentrations

The two air quality monitoring sites in Sonoma County are located in Healdsburg and Santa Rosa. Multiple pollutants are monitored in Santa Rosa while the monitoring site in Healdsburg measures a single pollutant, ozone. Table 3.3-2 summarizes violations of air quality standards in Sonoma County for the five-year period 1999-2003.

Table 3.3-2. Air Quality Data Summary for Sonoma County, 1999-2003

Pollutant	Standard	Location	Days Standard Exceeded In:				
			1999	2000	2001	2002	2003
Ozone	Federal 1-Hour	Santa Rosa	0	0	0	0	0
		Healdsburg	0	0	0	0	0
Ozone	State 1-Hour	Santa Rosa	1	0	0	0	1
		Healdsburg	4	0	0	0	0
Ozone	Federal 8-Hour	Santa Rosa	0	0	0	0	0
		Healdsburg	2	0	0	0	0
PM_{10}	Federal 24-Hour	Santa Rosa	0	0	0	0	0
PM_{10}	State 24-Hour	Santa Rosa	1	0	2	2	0
$PM_{2.5}$	Federal 24-Hour	Santa Rosa	0	0	1	0	0
Carbon Monoxide	State/Federal 8-Hour	Santa Rosa	0	0	0	0	0
Nitrogen Dioxide	State 1-Hour	Santa Rosa	0	0	0	0	0

Source: Air Resources Board, Aerometric Data Analysis and Management Data (ADAM), 2004.

3.3.2 Regulatory Setting

Federal Regulations

Air pollution control and planning began in earnest in 1967 with the passage of the federal Clean Air Act. In 1970, the National Ambient Air Quality Standards (NAAQS) were established for six pollutants. These pollutants are commonly referred to as criteria pollutants because criteria documents, which establish the relationship between exposure and effects on human health, have been prepared for each contaminant. They include ozone, carbon monoxide, nitrogen oxide, sulfur dioxide and particulate matter. The NSCAPCD portion of the County is classified as having attained all federal standards.

The USEPA is responsible for implementing programs established under the federal Clean Air Act. Responsibilities include establishing and reviewing the national ambient air quality plans and judging the adequacy of State Implementation Plans. The USEPA has delegated authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

If an area does not meet the NAAQS over a period of three years, the EPA designates it as a “nonattainment” area for that particular pollutant. The USEPA requires states with areas not in compliance with the national standards to prepare and submit air quality plans showing how they will come into compliance. If the states cannot show how the standards would be met immediately, then they must show progress toward meeting the standards. Such a plan is referred to as the State Implementation Plan (SIP). Under severe cases, the USEPA may impose a federal plan to show progress in meeting the federal standards.

Under the NAAQS, the Bay Area is classified a “moderate nonattainment” area for the 1-hour ozone standard. Exceedances of the standard are usually experienced in the far eastern and southern portions of the Bay Area. The region is considered unclassified under the 8-hour ozone standard. The region has until 2006 to meet the NAAQS for 1-hour ozone concentrations under the attainment plan submitted by the region and approved by USEPA. The northern portion of Sonoma County is considered unclassified or in attainment for the standard ozone NAAQS, because monitoring data show no exceedances in these areas.

Prior to 1998, the Bay Area was a “moderate nonattainment” area for carbon monoxide due to localized exceedances of the national carbon monoxide standards in downtown San Jose and Vallejo. The carbon monoxide standards have not been exceeded since 1991. Since the region had not experienced exceedances of the carbon monoxide standards, the San Francisco Bay Area Redesignation Request and Maintenance Plan for the National Carbon Monoxide Standard were submitted to USEPA in 1994. In 1998, USEPA approved the plan and reclassified the area as a carbon monoxide “maintenance” area. Northern Sonoma County and Lake County are considered unclassified because exceedances of the carbon monoxide standard have not been measured, and violations of the standard are unlikely.

For all pollutants other than ozone, the NSCARP area, including the entire San Francisco Bay Area, is in attainment of the NAAQS. Sonoma County has not measured ambient air pollutant concentrations in excess of those allowed by the NAAQS.

State Regulations

The State has its own air quality standards and air pollution planning programs. In 1988 the California legislature passed the California Clean Air Act (CCAA), which required air districts to develop air quality plans to meet State standards. The ARB is the State air pollution control agency. In general, the CCAA required the reduction of air pollutants by five percent or more per year or the implementation of "all feasible measures" to meet the state air quality standards as expeditiously as possible. The CCAA sets more stringent air quality standards for all of the pollutants covered under national standards (i.e., NAAQS), and additionally regulates levels of vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing particulates. If an area does not meet the California Ambient Air Quality Standards (CAAQS), the ARB designates the area as a non-attainment area. Areas that have met these State standards are considered to be attainment areas. Similarly, areas that have not met these standards are determined to be non-attainment areas. An area that is close to attaining the standard would be given a non-attainment/transitional designation.

The ARB establishes and periodically reviews the State ambient air quality standards, prepares the California SIP, secures approval of that plan from USEPA, and identifies toxic air contaminants. ARB also oversees the activities of air quality management districts, which are organized at the county or regional level. As a general matter, USEPA and ARB regulate emissions from mobile sources and consumer products, and the local air districts regulate stationary emission sources. Unlike stationary sources, mobile sources of air pollutants are not regulated through individual permits but rather through vehicle emissions standards, fuel specifications, and vehicle inspection and maintenance programs.

The ARB requires regions that do not meet the CAAQS for ozone to submit clean air plans that describe plans to attain the standard. Based on the California standards, the Bay Area is a serious nonattainment area for ozone (since the area cannot forecast attainment of the State ozone standard in the near future), nonattainment for PM_{10}, and nonattainment for $PM_{2.5}$. NSCAPCD is classified as non-attainment for the State ozone and PM_{10} standards. It should be noted that in 2004, the NSCAPCD was classified as attainment for the State ozone standard; however, a failure at an ozone monitor within NSCAPCD jurisdiction resulted in the ARB reclassifying the NSCAPCD as a nonattainment area for the ozone standard due to a lack of available monitoring data (Erdman, 2006). This reclassification has not resulted in requirements for NSCAPCD to prepare a Clean Air Plan. The NSCARP area is classified as attainment or unclassified for all other CAAQS.

Regional and County Air Quality Regulations and Planning

The BAAQMD was created by the California Legislature in 1955. The BAAQMD oversees development of air quality plans, regulations, and permitting for air pollution emissions in the southern portion of Sonoma County. As described in the above section, the BAAQMD operates a regional monitoring network that measures the ambient concentrations of criteria air pollutants. The BAAQMD also regulates stationary sources through its permitting program. Clean Air Plans are prepared by the BAAQMD in conjunction with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG). NSCAPCD has not been required to prepare a Clean Air Plan.

Bay Area 2005 Ozone Strategy

The BAAQMD, in cooperation with the MTC and the ABAG has prepared the Bay Area 2005 Ozone Strategy. The Ozone Strategy is a roadmap showing how the San Francisco Bay Area will achieve compliance with the State 1-hour air quality standard for ozone as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins.

Bay Area Ozone Attainment Plan

To fulfill federal Clean Air Act requirements for the San Francisco Bay Area Air Basin, ABAG, the MTC, and BAAQMD jointly prepared a Bay Area Air Quality Plan in 1982. This plan predicted attainment of all national clean air standards within the basin by 1987. This forecast was somewhat optimistic in the attainment of federal clean air standards was only briefly achieved in the early 1990’s. Violations of the NAAQS in the mid to late 1990’s resulted in the necessity to update the plan. The USEPA indicated its intention to reject portions of the 1999 Ozone Attainment Plan. As a result, the 2001 Ozone Attainment Plan was prepared and submitted to the USEPA. Portions of this latest plan have been approved by the USEPA. This plan forecasts attainment of the 1-hour ozone NAAQS by 2006.

Bay Area Clean Air Plan

As required under the California Clean Air Act, the Bay Area Clean Air Plan (CAP) was prepared in 1991. Triennial assessments and revisions to the CAP have subsequently been prepared in 1994, 1997, and 2000. The 2000 Bay Area CAP contains specific measures intended to improve air quality through tighter industry controls, cleaner cars and trucks, and cleaner fuels. The plan encourages cities and counties to adopt measures to support this clean air goal. Any project that attracts automobile traffic may be found to have a significant air quality impact, according to BAAQMD, if the project's traffic generation has not been properly anticipated in the regional air quality plan. No air quality plans are required for areas violating the State PM10 standard. Refer to Section 3.9, Table 3.9.3 for a list of applicable goals, objectives, and policies of the Sonoma County General Plan regarding air quality.

3.3.3 CEQA Thresholds of Significance Criteria

In accordance with CEQA Guidelines and for the purposes of this analysis, the NSCARP would be deemed to have a significant air quality impact if NSCARP:

1. Conflicts with or obstructs the implementation of the applicable air quality plan or State Implementation Plan (SIP);
2. Results in emissions that would violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation;
3. Results in a cumulatively considerable net increase of any criteria pollutant for which the region is considered non-attainment under any Federal or State ambient air quality standard;
4. Exposes sensitive receptors to substantial toxic air contaminant pollutant concentrations; or,
5. Creates objectionable odors affecting a substantial number of people.

In addition to the above significance criteria, both the BAAQMD and NSCAPCD have established quantitative thresholds for specific criteria air pollutant emissions by which to assess the significance of a project's potential air quality impacts; however, in the case of this project, determination of significance based on the quantitative criteria is not applied to the primary source of project emissions (mobile construction sources). See Impact AQ-1 – Discussion. Quantitative significance criteria are presented in Table 3.3-3.

Table 3.3-3. Air Quality Significance Thresholds

Pollutant	BAAQMD		NSCAPCD	
	Pounds/Day	Tons/Year	Pounds/Day	Tons/Year
NO_X	80	15	--	40
ROG	80	15	--	40
PM_{10}	80	15	--	15
CO	--	--	--	100

Source: BAAQMD, NSCAPCD

3.3.4 Alternatives Analysis

Alternative 1 (No Project)

Alternative 1 of the NSCARP is the no action alternative. Under this alternative, no action would take place and no emissions of air pollutants would result. Therefore, there would be no air quality impacts associated with Alternative 1. As such, Alternative 1 is not considered further in the following air quality analysis. However, Alternatives 2, 3, and 4 would result in both short-term air emissions (construction-related) and long-term air emissions (operation-related). Short-term emissions would be generated by construction equipment associated with pipeline installation, reservoir construction, and pump station construction. Long-term emissions would be generated by routine inspection, maintenance activities, and repair of the proposed facilities as well as routine testing of the diesel-fueled emergency generators located at pump stations.

Alternatives 2, 3, and 4 - Impacts Resulting from Project Construction

For purposes of this analysis, it is assumed that the peak daily and peak annual construction-related emissions would occur over a ten-year period for Alternative 2, a two-year period for Alternative 3, and a one-year period for Alternative 4. These construction scenarios represent the quickest project build-out rates for each alternative considered and, thus, the worst-case scenario for emissions of air pollutants and potential air quality impacts. The actual rate of construction for each alternative may actually occur over a longer period whereby the peak daily and peak annual emissions would be reduced.

The primary sources of criteria pollutant emissions for Alternatives 2, 3, and 4 would result from the use of internal combustion engines during construction activities. Specifically, conventional construction equipment such as excavators, backhoes, cranes, generators, air compressors, welders, and drilling/boring spreads would be utilized to execute the project. Additional sources of air pollutant emissions include emissions from on-road motor vehicles used to transport materials and personnel, fugitive dust emissions from activities involving soil disturbances, and off-gas from asphalt operations. Execution of Alternatives 2, 3, and 4 consist of the same types of construction activities (pipeline installation, reservoir construction, and pump station construction) and would utilize the same construction equipment spreads. As such, the peak daily and peak annual emissions associated with Alternatives 2, 3, and 4 are all equivalent. However, the total emissions associated with construction of Alternatives 2, 3, and 4 vary due to the overall construction duration of each alterative.

Criteria pollutant emissions for heavy construction equipment were estimated using established emission factors from the ARB's OFFROAD model (ARB, 2004). The maximum rated brake horsepower, projected hours of operation, and load factors were used along with the established emission factors. Emissions associated with worker travel to the site and truck traffic were estimated using the ARB's EMFAC2002 model (ARB, 2002a). Fugitive dust emissions were calculated based on emission factors for soil disturbances from the BAAQMD's CEQA Guidelines (BAAQMD, 1999). Asphalt off-gas emissions were based on emission factors from the ARB's URBEMIS2002 Model (ARB, 2002b). All supporting construction emission calculations are provided in Appendix E. A summary of the estimated peak daily and peak annual emissions of NO_X, ROG, PM_{10}, and CO for Alternatives 2, 3, and 4 are listed by each proposed activity in Table 3.3-4. A comparison of the total estimated construction emissions for each evaluated project alternative is presented in Table 3.3-5.

Table 3.3-4. Estimated Peak Daily and Peak Annual Construction Emissions for Project Alternatives 2, 3 and 4 (Uncontrolled)

Project Component	Pounds/day				Days/ Year	*Tons/Year*			
	NO_X	*ROG*	PM_{10}	CO		NO_X	ROG	PM_{10}	CO
Pipeline Installation	502.7	57.0	281.9	195.1	150	37.7	4.3	21.1	14.6
Reservoir Construction	350.4	32.4	272.8	131.2	150	26.3	2.4	20.5	9.8
Pump Station Construction	39.8	4.8	53.4	24.7	75	1.5	0.2	2.0	0.9
Peak Construction Total	892.9	94.2	608.1	351		65.5	6.9	43.6	25.3

Table 3.3-5. Comparison of Project Alternatives - Total Construction Emissions (Uncontrolled)

Project Alternative	Total Tons			
	NO_X	*ROG*	PM_{10}	CO
Alternative 1 (No Action)	0	0	0	0
Alternative 2 (10 years)	655	69	436	253
Alternative 3 (2 years)	131	13.8	87.2	50.6
Alternative 4 (1 year)	65.5	6.9	43.6	25.3

This air quality analysis assumes that all three construction components for Alternatives 2, 3, and 4 (pipeline installation, reservoir construction, and pump station construction) may occur simultaneously. Peak daily emissions are estimated at 892.9 pounds per day (ppd) NO_X, 94.2 ppd ROG, 608.1 ppd PM_{10}, and 351 ppd CO. Peak annual emissions are estimated at 65.5 tons per year (tpy) NO_X, 6.9 tpy ROG, 43.6 tpy PM_{10}, and 25.3 tpy CO.

Impact AQ-1: Emissions of Criteria Pollutants Based on Mass Emissions Thresholds Established by the BAAQMD and NSCAPCD.

> **Discussion:** The quantitative BAAQMD significance thresholds are not applicable to the construction phase of impacts (BAAQMD, 1999). Although the construction phase of the project is temporary in nature and is not subject to compliance with the established BAAQMD thresholds of significance, the BAAQMD's CEQA Guidelines state that determination of significance with respect to construction emissions should be based on consideration of implemented control measures. The BAAQMD has identified feasible PM_{10} control measures that should be implemented at all construction sites. If all of the applicable control measures are implemented, air pollutant emissions from construction activities would be considered a less than significant impact (BAAQMD, 1999). The NSCAPCD quantitative significance thresholds are applicable to both the construction

and operational phases of proposed projects. However, the NSCAPCD annual mass significance thresholds are typically applied to stationary sources of air emissions. The NSCAPCD recommends implementing the same best available control practices recommended by the BAAQMD to both reduce emissions to the maximum extent possible and the significance of air quality impacts to a less than significant level (Saschin, pers comm., 2006).

Alternatives 2, 3, and 4 would result in the estimated emissions presented in Tables 3.3-4 and 3.3-5. As stated in the BAAQMD CEQA Guidelines, lead agencies do not need to quantify emission reductions from construction-related emissions (BAAQMD, 1999). Rather, the recommended approach to mitigating construction emissions focuses on consideration of whether all feasible control measures are being implemented. Because BAAQMD guidelines prescribe a qualitative approach to mitigation measures for construction-emissions reduction, it is therefore, not necessary to quantify emissions reductions to determine level of significance. Furthermore, lead agencies seeking to reduce emissions from specifically construction equipment exhaust (not PM_{10}), can apply mitigation measures to the project, as described in Mitigation Measure AQ-2. Taking this into account, BAAQMD and NSCAPCD-recommended control measures identified in Mitigation Measures AQ-1 and AQ-2 have been incorporated into the project design to reduce construction emissions to a less than significant level. After implementation of these control measures, construction air quality impacts based on mass emissions significance thresholds (peak daily and peak annual) for Alternatives 2, 3, and 4 would be less than significant.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 2

Mitigation Measure AQ-1:

A. The following measures have been incorporated into the project design to reduce construction related air quality impacts from fugitive dust emissions resulting from construction of Alternatives 2, 3, and 4 to a less than significant level:

- Water all active construction areas at least twice daily;
- All trucks transporting soil, sand, or other loose materials will be covered or will maintain at least two feet of freeboard;
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites;
- Sweep daily all paved access roads, parking areas, and staging areas at construction sites;
- Sweep streets daily if visible soil material is carried on adjacent public streets;

- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more);
- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed sediment stockpiles;
- Limit traffic speeds on unpaved roads to 15 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways;
- Replant vegetation in disturbed areas as quickly as possible.
- Install wheel washers for all existing trucks, or wash off the tires or tracks of all trucks and equipment leaving the site; and,
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.

B. The SCWA shall apply the following mitigation measures to help reduce emissions from construction equipment exhaust (e.g. NOx, ROG, CO):

- Use alternatively fueled construction equipment where feasible;
- Minimize idling time (e.g. 5-minute maximum);
- Maintain properly tuned equipment; and,
- Limit the house of operations of heavy duty equipment and/or the amount of equipment in use, to the extent feasible.

Impact after Mitigation: Less than Significant. Although several thresholds pertaining to construction emissions are exceeded; however, BAAQMD thresholds are not applicable to the construction phase of impacts (BAAQMD, 1999). Furthermore, as stated above, NSCAPCD thresholds are typically applied to stationary sources of air emissions. With implementation of Mitigation Measure AQ-1, impacts are less than significant.

Impact AQ-2: Conflicts with Clean Air Plan.

Discussion: NSCAPCD has not been required to develop a regional air quality plan such as a SIP or Clean Air Plan. Because no plan exists, no conflict would occur within NSCAPCD jurisdiction for Alternatives 2, 3, and 4. The BAAQMD does have a Clean Air Plan to demonstrate progress towards meeting the state ozone air quality standard. The proposed project would not result in population growth or substantial transportation growth that has not been considered in the Clean Air Plan. Construction equipment emits carbon monoxide and ozone precursors. However, these emissions are included in the emission inventory that is the basis for regional air quality plans and are not expected to impede attainment or maintenance of air quality standards in the BAAQMD. If all applicable PM_{10} control measures recommended by the BAAQMD are implemented during the construction phase of a project, PM_{10} emissions may also be considered less than significant (BAAQMD, 1999). As all recommended PM_{10} control measures have been implemented (see Section 3.3.5), no conflict with the Clean Air Plan is expected to result from construction of Alternatives 2, 3, and 4. This is a less than significant impact.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 1

Mitigation Measure: None required.

Impact AQ-3: Violation of ambient air quality standards.

Discussion: Both the BAAQMD and NSCAPCD significance thresholds for emissions of criteria air pollutants are intended to help identify potential localized violations of health-based ambient air quality standards. In the case of construction emissions, the BAAQMD and NSCAPCD determine the significance of air quality impacts not on mass emissions, but on the control measures that are implemented to reduce construction emissions to the maximum extent feasible. Because the recommended control measures have been incorporated into the proposed project (Section 3.3.5), construction emissions are determined to be less than significant and therefore are not expected to result in a violation of any ambient air quality standard. While the effects on ambient pollutant concentrations (i.e., local air quality) resulting from a particular project cannot be determined with any certainty without the use of dispersion modeling, the mobile nature of construction emissions from Alternatives 2, 3, and 4 would result in dispersion over a large geographic area rather than concentrating emissions in one local area and is expected to further reduce the potential for any exceedances to occur during construction. This is a less than significant impact.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 2

Mitigation Measure: None required.

Impact AQ-4: Cumulatively considerable net increase of any criteria pollutant for which the region is considered non-attainment.

Discussion: Alternatives 2, 3, and 4 would result in considerable construction emissions of ozone precursors and PM_{10}. Although measures recommended by the BAAQMD and NSCAPCD to reduce the project-specific construction air quality impacts to a less than significant level have been incorporated into the project design (see Section 3.3.5), the emissions would remain considerable to the project region. However, the BAAQMD CEQA Guidelines state that a project proposed in an area with a general plan that is consistent with the applicable Clean Air Plan and does not require an amendment to the general plan would not have a significant impact (provided that the project does not have individually-significant air quality impacts). The applicable general plan for the project is the 1989 Sonoma County General Plan.

Implementation of Alternatives 2, 3, and 4 could potentially require an amendment of the Sonoma County General Plan for a specific parcel where a project facility, such as a reservoir or pump station, is proposed and based on the existing land use designation. However, the Sonoma County General Plan was adopted prior to adoption of the first BAAQMD Clean Air Plan in October 1991 and the NSCAPCD does not have a Clean Air Plan. As such, this evaluation criterion is not applicable to the proposed project. Sonoma County is in the process of updating their General Plan and has prepared a Draft EIR for the General Plan Update. The Draft EIR concludes that the Updated General Plan is consistent with the BAAQMD Clean Air Plan (Sonoma County, 2006). Considering the above, construction of Alternatives 2, 3, and 4 would not have a cumulatively considerable impact on air quality. This is a less than significant impact.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 3

Mitigation Measure: None required.

Impact AQ-5: Expose sensitive receptors to toxic air contaminant pollutant concentrations.

Discussion: Construction of Alternatives 2, 3, and 4 would result in diesel exhaust emissions from the operation of conventional construction equipment fueled by diesel fuel. Particulate exhaust emissions from diesel-fueled engines were identified as a toxic air contaminant by the ARB in 1998. Although Alternatives 2, 3, and 4 would result in considerable PM_{10} emissions, a majority of the total PM_{10} emissions would be in the form of fugitive dust from soil disturbances rather than from diesel engine exhaust. Of a total 608.1 pounds of peak daily PM_{10} emissions for Alternatives 2, 3, and 4, only 47.1 ppd would be in the form of PM_{10} engine exhaust emissions. Assessing potential impacts of toxic air contaminants on sensitive receptors (residential or workers) typically assumes long-term exposures of 46 years for workers and 70 years for nearby residents. Because the construction phase of the proposed project has a short-term duration (much less than 46 years) and the diesel PM_{10} emissions are relatively minor (and would occur over the entire construction spread rather than any one individual location), construction impacts from toxic air contaminant emissions for Alternatives 2, 3, and 4 are less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 4

Mitigation Measure: None required.

Impact AQ-6: Create objectionable odors affecting a substantial number of people.

Discussion: Alternatives 2, 3, and 4 do not include any construction component with the potential to create objectionable odors that would affect a substantial number of people. No odor-related impacts are anticipated.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 5

Mitigation Measure: None required.

Alternatives 2, 3, and 4 - Impacts Resulting from Project Operation

Operation of Alternatives 2, 3, and 4 would result in minor criteria pollutant emissions resulting from routine facility inspections, minor facility repair activities, and routine testing of the diesel-fueled emergency generators associated with the pump stations. Emissions are expected to result from on-road vehicles operating between project sites, welding machines used for maintenance/repair work, backhoes, and emergency generators. It has been assumed that the emergency generators would be rated at 100 brake-horsepower and each pump station would be equipped with one generator. These engines may require permits to operate from the BAAQMD or NSCAPCD. Water conveyance would primarily be achieved by operating electrically powered pumps and would not generate air emissions. A comparison of the peak daily and total annual emissions of Alternatives 2, 3, and 4 are presented in Table 3.3-6. These estimates assume that all facility inspection, maintenance, and repair activities would occur on the same day, which likely provides an overestimate of the peak daily emissions. However, this assumption provides a conservative approach to quantifying the operational emissions associated with Alternatives 2, 3, and 4 and ensures that a worst-case scenario is used to assess potential air quality impacts. A tabulation of emission calculations and operational assumptions are provided in Appendix E.

Table 3.3-6. Estimated Peak Daily and Peak Annual Operational Emissions

Project Alternative	Pounds/day				Tons/Year			
	NO_X	*ROG*	PM_{10}	CO	NO_X	ROG	PM_{10}	CO
Alternative 1	0	0	0	0	0	0	0	0
Alternative 2	56.0	6.7	4.0	23.0	0.46	0.05	0.03	0.17
Alternative 3	13.6	2.0	1.1	6.4	0.10	0.01	0.01	0.04
Alternative 4	14.0	2.1	1.1	6.6	0.10	0.01	0.01	0.04

Impact AQ-7: Emissions of criteria pollutants based on mass emissions thresholds established by the BAAQMD and NSCAPCD.

Discussion: Both the BAAQMD and NSCAPCD quantitative significance thresholds presented in Table 3.3-3 are applicable to the operational phases of Alternatives 2, 3, and 4. The peak daily and total annual operational emissions associated with Alternatives 2, 3, and 4 are below the BAAQMD and NSCAPCD established mass significance criteria. The estimated worst-case operational emissions associated with Alternatives 2, 3, and 4 are less than significant.

Impact Category: Less than Significant.

CEQA Threshold of Significance Criterion: 2

Mitigation Measure: None required.

Impact AQ-8: Conflicts with Clean Air Plan.

Discussion: Operation of Alternatives 2, 3, and 4 would result in emissions of criteria air pollutants at levels below the established BAAQMD and NSCAPCD established mass significance criteria. In addition, Alternatives 2, 3, and 4 would not result in population growth or substantial transportation growth that has not been considered in the BAAQMD Clean Air Plan. The NSCAPCD does not have a Clean Air Plan. No conflict with the BAAQMD Clean Air Plan would result from Alternatives 2, 3, and 4. This is a less than significant impact.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 1

Mitigation Measure: None required.

Impact AQ-9: Violation of ambient air quality standards.

Discussion: Both the BAAQMD and NSCAPCD significance thresholds for emissions of criteria air pollutants are intended, among other things, to help identify potential localized violations of health-based ambient air quality standards. Because the operational emissions associated with Alternatives 2, 3, and 4 are below established mass significance criteria developed by the BAAQMD and NSCAPCD, emissions are less than significant and therefore are not expected to result in a violation of any ambient air quality standard. This is a less than significant impact.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 2

Mitigation Measure: None required.

Impact AQ-10: Cumulatively considerable net increase of any criteria pollutant for which the region is considered non-attainment.

Discussion: The BAAQMD CEQA Guidelines state that a project proposed in an area with a general plan that is consistent with the applicable Clean Air Plan and does not require an amendment to the general plan will not have a significant cumulative impact (provided that the project does not have individual significant air quality impacts). The applicable general plan for the project is the 1989 Sonoma County General Plan. Implementation of Alternatives 2, 3, and 4 could potentially require an amendment of the Sonoma County General Plan for a specific parcel where a project facility, such as a reservoir or pump station, is proposed and based on the existing land use designation. However, the Sonoma County General Plan was adopted prior to adoption of the first BAAQMD Clean Air Plan in October 1991 and the NSCAPCD does not have a Clean Air Plan. As such, this evaluation criterion is not applicable to the proposed project. Sonoma County is in the process of updating their General Plan and has prepared a Draft Environmental Impact Report for the General Plan Update. The Draft EIR concludes that the Updated General Plan is consistent with the BAAQMD Clean Air Plan (Sonoma County, 2006). Considering the above, operation of Alternatives 2, 3, and 4 would not have a cumulatively considerable impact on air quality. This is a less than significant impact.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 3

Mitigation Measure: None required.

Impact AQ-11: Expose sensitive receptors to toxic air contaminant pollutant concentrations.

Discussion: Operation of Alternatives 2, 3, and 4 would result in diesel exhaust emissions from the operation of diesel-fuels conventional construction equipment and on-road vehicles. Based on a worst-case scenario that considers all routine inspection, maintenance, and facility repair activities would occur on the same day and that all PM_{10} engine exhaust is emitted in the form of diesel PM_{10}, a maximum of four pounds per day (ppd) diesel PM_{10} would result. Considering the limited mass of diesel PM_{10} that could result, geographic separation between many of the sources, as well as the mobile nature of many sources, these emissions would not result in exposing sensitive receptors to substantial toxic air contaminant pollutant concentrations. There are no other toxic air contaminants expected to be emitted during operation of Alternatives 2, 3, and 4. This is a less than significant impact.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 4

Mitigation Measure: None required.

Impact AQ-12: Create objectionable odors affecting a substantial number of people

Discussion: Alternatives 2, 3, and 4 would include the storage and conveyance of tertiary-treated water, which essentially has no odor. Based on the experience at existing reservoirs operated by the SCWA, odor has not been an issue identified by operators, nor have complaints been received from the public. Operation of the Alternatives 2, 3, and 4 do not include any component with the potential to create objectionable odors that would affect a substantial number of people. No odor-related impacts would result.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 5

Mitigation Measure: None required.

3.4 BIOLOGICAL RESOURCES

3.4.1 Introduction

This chapter provides a description of the biological resources located on or immediately adjacent to the NSCARP study area, and an analysis of the impacts of the project on these resources. Biological resources were evaluated based upon: 1) site investigations; 2) consultation with resource agencies, and 3) a review of pertinent planning and scientific literature. Site investigations were conducted by Padre biologists and included reconnaissance-level surveys for special-status species, habitat mapping, identification of principal plant and animal species, and riparian and wetland reconnaissance surveys. Wildlife and vegetation surveys were conducted concurrent with habitat mapping. Surveys entailed walking transects of opportunity through each habitat type and recording the animals visually observed or heard calling. Animals were also identified indirectly by the presence of tracks, nests, burrows, and scat. Common names are used throughout the text of this chapter for ease of use. Scientific names corresponding to the common names are found in Tables 4-1 and 4-2 in Attachment 3 of Appendix F for plants, animals, and in Tables 5-1 through 5-4 in Attachment 4 of Appendix F for special-status species.

Literature Review

Padre biologists reviewed available pertinent literature including Sonoma County soil survey maps (Miller, 1972); National Wetland Inventory (NWI) maps (USFWS, 1989); topographic maps (USGS, 1992); project maps and aerial photographs; regional field guides (Best et al., 1996; Bolander and Parmeter, 2000, Burridge, 1995); and pertinent environmental documents and reports (City of Santa Rosa, 2003).

The California Natural Diversity Database (CNDDB) was queried for records of special-status species within the Healdsburg, Jimtown, Geyserville, Cloverdale, Guerneville, Sebastopol, Asti, Warm Springs Dam, Sebastopol, and Camp Meeker 7.5-minute USGS quadrangles (California Department of Fish and Game, 2005). The USFWS provided lists of protected species occurring within the project area on August 23, 2005 and an updated list on November 2, 2006. Special-status taxa that are known to exist or have the potential to exist on the project site were also identified through a review of relevant literature (CNPS, 2001; Zeiner et al., 1988; 1990a, b).

3.4.2 Regulatory Setting

See Attachment 2, Appendix F for a discussion of the various local, state, and federal regulations pertaining to biological resources that could be affected by project implementation.

3.4.3 Environmental Setting

Vegetation and Cover Types. The NSCARP project area is within the Northwestern California region of the California Floristic Province, as identified by the Jepson Manual (Hickman, 1993). This region is further divided into the Outer North Coast Ranges district, which is characterized by redwood, mixed-evergreen, and mixed-hardwood forests, and by very high rainfall. The specific vegetative cover types in this district include Oak Woodland, Riparian Woodland, Freshwater Emergent Wetland, Annual Grassland, Developed Lands, and Agricultural Lands. Descriptions of these cover types along with acreage estimates are contained in Attachment 3 of Appendix F. In addition, Table 1 in Attachment 3 of Appendix F identifies plant species found in the various plant communities in the NSCARP project area during site reconnaissance surveys. Attachment 5 of Appendix F includes the GIS-based vegetative cover type maps of the NSCARP area.

Wildlife. The various vegetative cover types along the NSCARP project alignment provide habitat for resident and migratory wildlife species. The composition, density, distribution, and physical characteristics of these vegetative communities determine the abundance and diversity of wildlife species residing in the project area. The interspersion of upland, wetland, and aquatic habitat provide forage, roost, and cover for wildlife, and water is available in the Russian River, Dry Creek, Mark West Creek, and agricultural stock ponds on a perennial basis. Wildlife observed during project surveys and reported from earlier studies are detailed in Table F-4-2 in Attachment 3 of Appendix F. The following is a brief description of the wildlife typical associated with the vegetative cover types.

Oak Woodland Series. Coast live oak and valley oak woodland habitats are productive wildlife habitats with over 265 vertebrate species reported throughout California. These include 42 species of birds, 21 species of amphibians, 31 species of reptiles, and 74 species of mammals (CDFG, California Wildlife Habitat Relationship System, Version 5.0). In addition, an estimated 5,000 species of insects use oak woodlands, of which 1,000 are dependent on oaks (Griffin and Muick, 1990). Passof *et al.* (1985) have identified two wildlife species that occur in the area (acorn woodpecker and wild pig) that are dependent on acorns for "essential" forage; three species for which acorns are "sometimes essential" (wild turkey, band-tailed pigeon, and white-breasted nuthatch); and 17 species, including black-tailed deer, California quail, California mouse, California ground squirrel, and western gray squirrel, for which acorns are a "preferred" forage.

However, as noted by Block *et al.* (1990), the vast majority of the wildlife species inhabiting oak woodlands do not depend primarily on acorns. Instead, they browse on oaks and shrubs (deer and rabbits); eat fruits; graze on herbaceous understory; or, in the case of small mammals and ground-foraging birds, feed on seeds of grasses and forbs. Verner (1987) noted that oak woodlands rank among the top tree habitats in providing wildlife breeding habitat.

Mixed Willow Series and California Bay Series. Riparian woodland and associated areas support the greatest diversity of wildlife of terrestrial habitats in California (Laymon, 1984). This is due to floristic and structural diversity, microclimatic conditions, abundance of edge, availability of food and water, migration and dispersal corridors, and escape, nesting, and thermal cover (Sander *et al.*, 1985; Grenfell, 1988). Laymon (1984) reported 147 bird species as nesters or winter visitants to Central Valley foothill riparian communities. Johnson (1982) recorded over 220 species of birds along the American River Parkway riparian corridor in Sacramento, and over 60 of these commonly nest in Central Valley riparian habitats (Gaines, 1974). Trapp *et al.* (1984) reported 55 species of mammal inhabiting the Central Valley riparian communities, and over 30 species of mammals have been reported along the American River (U.S. Fish and Wildlife Service, 1991). Brode and Bury (1984) reported at least 50 species of amphibians and reptiles using riparian corridors.

Wetlands. Freshwater emergent wetland areas provide food, cover, and water for over 160 species of birds, and numerous mammals, amphibians, and reptiles (Kramer 1988). Riparian/wetland areas are considered to be of high value due to the presence of water, and the sensitive wildlife dependent upon these habitat types. Typical species expected to utilize these habitat types for breeding and/or foraging activities include the great blue heron, great egret, black phoebe, yellow warbler, yellow-breasted chat, Pacific tree frog, Northern Pacific pond turtle, muskrat, and western aquatic garter snake.

Developed Lands. Within commercial and residential areas, habitat components, such as roosting and nesting sites, escape cover, migration and/or travel corridors, and foraging habitat are lost or altered as a result of land use conversions. Consequently, the changes to the abiotic and biotic environments result in very low species populations and diversity. These areas favor inhabitation of those species that tolerate human presence, and are able to exploit human food resources, and use buildings or other human structure for cover and nesting. Typical species found in developed areas include a number of native species such as American kestrel, mourning dove, western scrub-jay, northern mockingbird, American robin, Brewer’s blackbird, house finch, deer mice, California ground squirrel, western gray squirrel, striped skunk, and Virginia opossum. Dominant introduced and pest species in the urban landscape include rock dove, European starling, and house sparrow, Norway rat, and house mouse.

Annual Grassland/Ruderal Lands. Because of the low-growth habit of most plant species in this cover type, it typically provides forage and cover for small mammals, such as meadow vole, deer mice, ground squirrels, and pocket gopher. These species, in turn, provide the prey base that attracts predators such as red-tailed hawk, white-tailed kite, American kestrel, gopher snake, rattlesnake, and coyote. Little nest cover is provided; however, certain species of plants, such as fennel, provide perch sites for birds. Typical bird species include western meadowlark, Brewer's blackbird, mourning dove, black phoebe, California quail, and western kingbird. Other animals common to this habitat include western fence lizard, alligator lizard, house finch, sparrows, wintering raptors, and striped skunk.

Vineyards and Agriculture. Vineyards are composed of single species planted in rows and usually supported on trellises. The area between the rows is usually cleared of herbaceous vegetation (Schultze, 1988). Some wildlife species, like deer, rabbits, and several species of birds, have adapted to vineyards and have become pests, which sometimes require exclusion efforts through fencing, sound guns, and other management techniques. Hilty and Merenlender (2002) reported that mammalian predators would differentially cross vineyards rather than degraded riparian area, but such use was very limited. In general, mammalian predators used riparian corridors 11 times more frequently than vineyards. Certain practices, such as inclusion of wide buffer zones between vineyards and natural areas, reduction of herbicide use through in-the-row tillage, enhancement of vineyard water supply ponds, retention of trees, and other sustainable and organic agricultural practices, can improve habitat conditions for native wildlife near vineyards (CAWG, 2003).

Special-Status Species. Special-status species potentially occurring in the vicinity of the NSCARP project area were identified through a query of the CNDDB for the Healdsburg, Jimtown, Geyserville, Cloverdale, Guerneville, Warm Springs Dam, Asti, Sebastopol, and Camp Meeker 7.5-minute USGS quadrangles. In addition, species lists provided by the USFWS and NOAA Fisheries provided additional species reported within these quadrangles (see Attachment

1, Appendix F). Tables 1 through 4 in Attachment 4 of Appendix F provide an analysis of the likelihood of occurrence of the species along the pipeline route based on the presence of suitable habitat, recorded range of the species, and previous sightings. The following is a description of the principal special-status plants and wildlife potentially occurring within the NSCARP project area based on: 1) a moderate likelihood of occurring in the project area (e.g., known occurrence with a project quadrangle and potential suitable habitat present); 2) high likelihood of occurrence (previously reported within one mile of the project site); and, 3) observed during project surveys. Attachment 4 of Appendix F also includes descriptions of other special-status species in Sonoma County that have a low likelihood of occurrence in the project area. Figures 3.4-1 through 3.4-4 depict the location of special-status species recorded within one mile of the NSCARP project.

Special-Status Plants

Vine Hill manzanita is a state-listed Endangered species and a CNPS List 1B species. It is an evergreen shrub that occurs in chaparral habitat, typically in acid marine sands. It blooms from February through April, and occurs at elevations from 160 to 400 feet, msl. There are known occurrences in Sonoma County near Forestville, which is within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Rincon manzanita is a CNPS List 1B species. It is an evergreen shrub species that occurs in chaparral and cismontane woodland habitat. It blooms from February through April, and is found at elevations from 250 to 1,200 feet, msl. This species is known from fewer than ten occurrences in Sonoma County and is seriously threatened by development. There are two recorded occurrences within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Sonoma sunshine is a federal and state-listed Endangered species and a CNPS List 1B species. It is an annual herbaceous species that occurs within vernal pools in valley and foothill grassland habitat. It blooms from March through May, and occurs at elevations from 35 to 360 feet, msl. It is known only from Laguna de Santa Rosa and the Sonoma area, and is threatened by urbanization, grazing, and agriculture. There are no recorded occurrences within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Narrow-anthered California brodiaea is a CNPS List 1B species. It is a perennial herbaceous species that occurs in broad-leaved upland forest, chaparral, and lower montane coniferous forest. It blooms from May through July, and occurs at elevations from 360 to 3,000 feet, msl. This species is known to occur in Lake, Sonoma, and Napa counties. There are two recorded occurrences within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Rincon Ridge ceanothus is a CNPS List 1B species. It is an evergreen shrub that occurs in closed-cone coniferous forest, chaparral, and cismontane woodland habitats on volcanic or serpentine soils. It blooms from February through April, and occurs at elevations from 250 to 3,400 feet, msl. There are three recorded occurrences within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

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Pennell's bird's-beak is a federally listed Endangered species, a state-listed Rare species, and a CNPS List 1B species. It is an annual herbaceous species that occurs in closed-cone coniferous forest and chaparral habitat on serpentine soils. It blooms from June through September, and occurs at elevations from 150 to 1,000 feet, msl. This species is known from fewer than five occurrences in Sonoma County and is threatened by vehicles, road maintenance, and development. There is one recorded occurrence within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Vine Hill clarkia is a federal and state-listed Endangered species and CNPS List 1B species. It is an annual herbaceous species occurring in chaparral and valley and foothill grasslands in acidic sandy loams. It blooms from June through August at elevations from 150 to 225 feet, msl. This species is only known from Pitkin Marsh, which is within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Dwarf downingia is a CNPS List 2 species. It is an annual herbaceous species that occurs in vernal pools within valley and foothill grassland habitats. It blooms from March through May, and occurs at elevations from 3 to 1,450 feet, msl. This species is threatened by urbanization, agriculture, grazing, and vehicles. There is one recorded occurrence within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Serpentine daisy is a CNPS List 1B species. It is a perennial herbaceous species that occurs in chaparral habitat, typically in seeps on serpentine soils. It blooms from May through August, and occurs at elevations from 200 to 2,200 feet, msl. This species is known only from two occurrences at the Cedars and along Porter Creek in Sonoma County. There is one recorded occurrence within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Fragrant fritillary is a CNPS List 1B species. It is a perennial herbaceous species from bulb that occurs in cismontane woodland, coastal prairie and scrub, and valley and foothill grassland habitats, often in serpentine soils. It blooms from February through April, and occurs at elevations from 10 to 1,350 feet, msl. This species is threatened by grazing, agriculture, and urbanization. There is one recorded occurrence within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Thin-lobed horkelia is a CNPS List 1B species. It is a perennial herbaceous species that occurs in broad-leaved upland forest and chaparral habitats in mesic openings on sandy soils. It blooms from May through July, and occurs at elevations from 160 to 1,650 feet, msl. This species is known from Mendocino, Marin, and Sonoma counties. There is one recorded occurrence within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Burke's goldfields is a federal and state-listed Endangered species and a CNPS List 1B species. It is an annual herbaceous species that occurs in meadows, seeps, and vernal pools. It blooms from April through June, and occurs at elevations from 50 to 2,000 feet, msl. This species is threatened by agriculture, urbanization, and grazing. There are five recorded occurrences within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Sebastapol meadowfoam is a federal and state-listed Endangered species and a CNPS List 1B species. It is an annual herbaceous species that occurs in meadows, seeps, and vernal pools. It blooms from April through May, and occurs at elevations from 50 to 1,000 feet, msl. This species is threatened by urbanization, agriculture, and grazing. There is one recorded occurrence within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Jepson's linanthus is a CNPS List 1B species. It is an annual herbaceous species that occurs in chaparral and cismontane woodland habitats, usually in volcanic soils. It blooms from April through May, and occurs at elevations from 330 to 1,650 feet, msl. This species is known to occur in Lake, Sonoma, and Napa counties. There are no recorded occurrences within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Marsh microseris is a CNPS List 1B species. It is a perennial herbaceous species that occurs in closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland habitats. It blooms from April through June and occurs at elevations from 15 to 1,000 feet, msl. There is one recorded occurrence within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Robust monardella is a CNPS List 1B species. It is a perennial herbaceous species that occurs in openings in chaparral, cismontane woodland, and coastal scrub habitat. It blooms from June through July, and occurs at elevations from 600 to 1,970 feet, msl. This species is known from approximately ten occurrences, most of which have not been seen in recent years. There is one recorded occurrence, an herbarium specimen collected in 1899, within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Baker's navarretia is a CNPS List 1B species. It is an annual herbaceous species that occurs in meadows and seeps in cismontane woodlands and lower montane coniferous forest habitat, and in vernal pools in valley and foothill grassland habitat. It blooms from May through July, and occurs at elevations from 50 to 5,700 feet, msl. There is one recorded occurrence within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Many-flowered navarretia is a federal and state-listed Endangered species and a CNPS List 1B species. It is an annual herbaceous species that occurs in volcanic ash flow vernal pools. It blooms from May through June, and occurs at elevations from 100 to 3,100 feet, msl. This species is known only from approximately seven occurrences in Lake and Sonoma counties, and is threatened by grazing, development, and vehicles. There is one recorded occurrence within one mile of the NSCARP project alignment (CNDDB, 2006; CNPS, 2001).

Special-Status Fish Species

California Coastal Chinook salmon is a federally listed Threatened species. NOAA Fisheries has separated this species into 17 distinct groups or evolutionary significant units (ESUs) based on similarity in life history, location, and genetic markers. The California Coastal Chinook salmon is the ESU occurring in the NSCARP area. The Chinook salmon is an anadromous species spending most of its adult life in the ocean and then returning to freshwater streams to spawn. They spend between one and seven years maturing in the ocean before they migrate upstream to spawn. Adult Chinook salmon die after spawning. Adult Chinook salmon return to the Russian River as early as August, but most migration occurs between October and November. They generally spawn into January in the mainstem above Asti and in selected tributaries, such as Dry Creek. Unlike coho salmon and steelhead, young Chinook salmon begin their out-migration soon after emerging from spawning gravels. Freshwater residence in coastal California stocks usually ranges from two to four months, and juveniles in the Russian River emigrate as fingerlings from late February through June. California Coastal Chinook salmon occur within one mile of the NSCARP project area (CNDDB, 2006).

Central California Coast coho salmon is a federally listed and state-listed Endangered species. NOAA Fisheries has designated six coho salmon ESUs, and the NSCARP project is within the range of the Central California Coast ESU. Coho salmon is an anadromous species spending a large portion of their life cycle in the ocean before migrating upstream to spawn in their natal streams. The primary factor influencing coho salmon abundance is poor logging practices and watershed management leading to deterioration of coastal spawning streams (Moyle, 2002). However, coho salmon adapt readily to hatchery rearing due to the long juvenile freshwater residency period allowing them to be released for emigration at an older age. This results in a better rate of survival and homing ability to spawn in their natal streams. Coho salmon spawn in coastal streams from Point Hope, Alaska south to the northern edge of Monterey Bay. Coho salmon generally enter the Russian River in November and December. Spawning occurs between December and January in the tributaries to the lower Russian River. Spawning has occurred in the upstream tributaries (Forsythe, Mariposa, Rocky, Fisher, and Corral creeks), but not in recent years (SCWA, 2004). The mainstem below Cloverdale is primarily a passage corridor. After hatching, young coho salmon spend about one year in freshwater before out-migrating to the ocean, which occurs in late winter and spring. Coho salmon live in the ocean for about 1.5 years, and return as three-year-olds to spawn and die. Factors that limit juvenile production are not clearly understood, but may include high water temperature, poor summer and winter habitat quality, and predation (SWCA, 2004). Coho salmon occur within one mile of the NSCARP project area (CNDDB, 2006).

Central California Coast steelhead is a federally listed Threatened species, and is one of 10 Distinct Population Segments (DPSs) designated by NOAA Fisheries. Steelhead is an anadromous species native to the Pacific Ocean and coastal drainages. Steelhead spend one to two years in the ocean before returning to spawn for the first time. Adult steelhead generally begin returning to the Russian River with the first heavy rains of the season in November or December, and continue to migrate upstream into March or April. The peak migration period is between January and March. Spawning generally occurs from January through April, depending on the time of the opening of the sandbar dam and freshwater entry. They spawn from Jenner Creek near the mouth to upper basin streams (Forsythe, Mariposa, Rocky, Fisher, and Corral creeks). Steelhead are iteroparous and do not die after spawning and, thus, may spawn again the following year. After hatching, steelhead usually spend one to two years in freshwater before emigration to the ocean between February and June, depending on flow and water temperatures. Fry and juvenile steelhead are extremely adaptable in their habitat selection. Steelhead rearing requirements include adequate cover, food supply, and suitable water temperatures. The species is widespread in the Russian River watershed, and occurs in all major tributaries and most of the smaller ones (SWCA, 2004; CNDDB, 2006).

Navarro roach is a California Species of Special Concern (CSC). The Navarro roach is one of five subspecies of the California roach and is restricted to the Navarro River system. It is a small fish, usually less than four inches in length, that is found in a variety of stream habitats including warm intermittent streams and cold, well-aerated streams. It is able to survive in small pools remaining after flows subside in intermittent streams. It feeds on filamentous algae, aquatic insects, and small crustaceans. During spawning, the fish moves up from pools into shallow, flowing areas with bottoms covered in small rocks. Spawning occurs from March through late July. There is one recorded occurrence within one mile of the NSCARP project area (CNDDB, 2006).

Russian River tule perch is a CSC. The Russian River tule perch is one of three subspecies of tule perch and is restricted to the Russian River system. It is a small, deep-bodied fish usually less than six inches in length. It occurs in large, low-elevation streams with beds of emergent aquatic plants and overhanging banks. It feeds on small invertebrates on the stream bottom or on aquatic vegetation, particularly larvae of chironomid midges, baetid mayflies, and blackflies. Tule perch is a member of the Embiotocidae family. This family does not lay eggs; rather, fertilization is internal, and the embryos obtain nourishment by absorbing ovarian fluids (viviparity). Mating occurs from July to October, and the young are born in May or June when food is abundant. There are two recorded occurrences within one mile of the NSCARP project area (CNDDB, 2006).

Special-Status Amphibian Species

California tiger salamander. The Sonoma County DPS of the California tiger salamander (CTS) is a federally listed Endangered species and a CSC. In a December 4, 2006 ruling, Judge Lloyd Connelly of the Sacramento Superior Court ordered the California Fish and Game Commission to accept the petition to list the CTS under CESA. This decision will initiate a full status review of the species and, in the interim, it will be a “candidate” species, and afforded the same protection as a listed species under CESA. The CTS is a large salamander with a total length up to 15 inches from snout to tail. The CTS is a black salamander with distinctive spots and bars ranging from white, cream, to yellow. It also has small eyes, a broad, rounded snout, and tubercles on the underside of the feet (Stebbins, 1985). CTS occur in central California from the central Sacramento Valley to the central San Joaquin Valley and surrounding foothills of both the Coast Range and the Sierra Nevada. It has been reported from the San Francisco Bay region, the Monterey Bay region, and valleys and foothills in San Luis Obispo and Santa Barbara counties. Within its range and during its active period, CTS is confined to breeding ponds within suitable habitat. Typically, adult CTS breeding ponds are natural and man-made ponds, intermittent streams, and vernal pools below the 1,500-foot elevation within grassland, savanna, and oak woodland habitats. Optimal habitat appears to be large vernal pools covering more than 250 ft^2 with fairly turbid water. Adult CTS are only active during the rainy season. They aestivate during the dry season. The adults break dormancy after the first fall rains. Rainfall also triggers adult migration to breeding ponds, and adults will migrate a distance up to 3,300 feet from aestivation burrows to breeding ponds. The breeding season extends from December through February with females laying numerous small clusters of eggs on submerged and emergent vegetation. Adults remain in breeding ponds for several days before exiting to forage in terrestrial habitat. Adult and terrestrial juvenile CTS forage on earthworms, snails, insects, fish, and small mammals by utilizing sit-and-wait tactics to capture their prey. Small aquatic larvae forage primarily on zooplankton while larger larvae forage on zooplankton, amphipods, mollusks, and insect larvae.

Most of the reported occurrences of CTS in Sonoma County are from the vernal pool complexes within the Santa Rosa Plain along the Laguna de Santa Rosa watershed (Sonoma County, 2005). This is at the extreme southern limits of the NSCARP project area near the Sonoma County Airport and Denner Ranch. No critical habitat has been designated for the Sonoma

DPS, but the Santa Rosa Plain Conservation Strategy (USFWS, 2005) is intended to contribute to the recovery of CTS as well as Burke's goldfields, Sonoma sunshine, Sebastopol meadowfoam, and many-flowered navarretia. The closest occurrence of CTS to the NSCARP project area is approximately 2.8 miles east of the Sonoma County Airport (CNDDB, 2006).

California red-legged frog is a federally listed Threatened species and a CSC. The California red-legged frog (CRLF) is one of the two subspecies of red-legged frogs found on the Pacific Coast; the other is the northern red-legged frog. The two species are sympatric along the Mendocino County coast between Point Arena and Elk. CRLF formerly ranged from northern California south along the Pacific Coast, west of the Cascade Mountains and the Sierra Nevada, to northern Baja California at elevations from near sea level to 8,000 feet. Populations remain in the San Francisco Bay Area, along the California coast, and the western edge of the Central Valley. The CRLF occurs in different habitats depending on their life stage and season. All stages are most likely to be encountered in and around breeding sites, which are known to include coast lagoons, marshes, springs, permanent and semi-permanent natural ponds, ponded and backwater portions of streams, as well as artificial impoundments such as stock ponds, irrigation ponds, and siltation ponds with dense and extensive vegetative cover of emergent and bank vegetation including willow, cattail, and bulrush. The largest California red-legged frog densities are associated with deep-water pools with dense stands of overhanging willows and an intermixed fringe of cattails. This subspecies breeds from November through March. Females lay between 2,000 to 5,000 eggs in clusters attached to emergent and submergent vegetation in ponds and backwater pools in creeks. The tadpoles remain in this habitat until they metamorphose in the summer, which requires three to five months. Principal prey of adults is aquatic and terrestrial insects, crustaceans, snails, worms, fish, tadpoles, and smaller frogs. Aquatic larvae are herbivorous. Predators include invertebrate, fishes, other amphibians, reptiles, and occasionally birds and mammals. There are no recorded occurrences within one mile of the NSCARP project area, and no critical habitat has been designated in Sonoma County (CNDDB, 2006).

Foothill yellow-legged frog is a CSC and a U.S. Forest Service (FS) and Bureau of Land Management (BLM) Sensitive species. The foothill yellow-legged frog (FYLF) is an inhabitant of streams and rivers in a variety of habitats including foothill woodland, chaparral, and forest within the Coast, Cascade, and Sierra ranges. The species ranges from sea level to 6,000 feet. It is generally found within a few feet of stream banks where it can bask on warm rocks, but escape quickly into the stream for protection. When frightened, it dives to the stream bottom and hides amid rocks, vegetation, and silt. They are active year-round in warm climates, but become inactive or hibernate in colder climates. Mating, which lasts about two weeks, occurs between March and May after high flows are over. Clusters of between 100 and 1,000 eggs are attached to gravel or rocks in moving waters near the stream edge and tadpoles emerge after about five days. The tadpoles reach a maximum size of about two inches and metamorphose to adult life stages within about four months of hatching. Adult FYLF prey on both aquatic and terrestrial invertebrates, with adult insects and snails among preferred prey. Tadpoles graze on algae and diatoms along rocky stream bottoms. Principal predators of adult yellow-legged frogs include garter snakes, while fish readily feed on egg masses. There are five recorded occurrences within one mile of the NSCARP project area (CNDDB, 2006).

Special-Status Reptile Species

Northern Pacific pond turtle is a CSC. The pond turtle occurs primarily in foothills west of the Cascade-Sierra crest throughout California (The Wildlife Society, 1994). The North Pacific subspecies ranges north of the San Francisco Bay area and intergrades with the Southern Pacific pond turtle in the southern portion of the Central Valley (Holland, 1991). Pacific pond turtles are a semi-aquatic species inhabiting streams, marshes, ponds, and irrigation ditches within woodland, grassland, and open forest communities, but require upland sites for nesting and over-wintering. Stream habitat must contain large, deep pool areas (six feet) with moderate-to-good plant and debris cover, and rock and cobble substrates for escape retreats. Preferred depth in pond habitat is between three to five feet with mud substrate. Dense inshore vegetation is especially critical for hatchlings where they spend the first few years of life. Turtles from riverine systems over-winter in upland areas, while pond dwellers may remain as permanent residents with only nesting forays performed annually by gravid females. There are five recorded occurrences within one mile of the NSCARP project area (CNDDB, 2006).

Special-Status Bird Species

Great blue heron is a California Department of Forestry and Fire Protection (CDF) Sensitive species. It is not a federal or state-listed species; however, its rookery sites are considered sensitive and protected by the State of California. This species is common throughout the year in most of California's shallow estuaries and fresh and saltwater wetlands. Rookeries are scattered throughout Northern California. It is a common widespread permanent resident in Sonoma County (Bolander and Parmeter, 2000), and there are confirmed, probable, and possible nesting records in the NSCARP project area (Burridge, 1995). The species may forage in the vicinity of the project, but there are no recorded rookeries within one mile of the project area (CNDDB, 2006).

White-tailed kite is a California Fully Protected Species and is protected as a bird-of-prey under Section 3503.5 of the California Department of Fish and Game Code. It is a small raptor with a total length of about 12 inches and is often identified from a distance by its hovering or "kiting" behavior while hunting. White-tailed kites predate mostly on voles and other diurnal mammals, but will occasionally prey on birds, insects, reptiles and amphibians. It typically forages in open grasslands and emergent wetlands. White-tailed kite nests in dense foliage in treetops near grassy foothills, marshes, riparian woodland, savanna, and partially cleared fields. It prefers oak, willow, sycamores, or other tree stands. White-tailed kites range from western California and southwestern Oregon to southeastern Arizona, and along the Gulf Coast from Texas to Florida, and peninsular Florida (Wheeler and Clark, 1995). It is a non-migratory resident of coastal and valley lowlands in cismontane California, where it is found in herbaceous and open stages of most habitats and generally near agricultural lands (Zeiner *et al.*, 1990). This species was observed during field surveys along the project alignment. There are confirmed, probable, and possible nesting records of the white-tailed kite in the NSCARP project area (Burridge, 1995).

Osprey is a CSC and a CDF Sensitive species. It occurs throughout California except within the deserts, Great Basin, and Central Valley. It breeds in large trees, snags, and dead-topped trees in open forest in northern California from the Cascade Range to Marin County along the coast, and to the southern Sierra Nevada range. Osprey predate upon mammals, birds, reptiles, and amphibians on occasion. It breeds from March to September and is a fairly common summer resident and uncommon winter visitant to Sonoma County (Bolander and Parmeter, 2000). According to the CNDDB, there is one recorded occurrence within one mile of the NSCARP project area, and there are confirmed, probable, and possible nesting records of the osprey in the NSCARP project area (Burridge, 1995).

Northern harrier is a CSC. The northern harrier inhabits meadows, grasslands, open rangelands, desert sinks, and fresh and saltwater emergent wetlands. It is seldom found in wooded areas. It forages mostly on voles and other small mammals, birds, frogs, small reptiles, crustaceans, insects, and, rarely on fish. Breeding occurs April to September, with peak activity June through July. It is a fairly common permanent resident and fall migrant in Sonoma County (Bolander and Parmeter, 2000). There are no known breeding records of the northern harrier in the NSCARP project area (Burridge, 1995), but the species was observed during field surveys along the NSCARP alignment.

Cooper's hawk is a CSC. The species nests in forest, woodland, and riparian habitats throughout the state. Outside of the breeding season, they also occur in more variable habitats such as open brushlands and scrub. Large nests observed in these areas could potentially be used by this species and the project site is likely used for foraging. Breeding occurs from March through August, with peak activity from May through July. It is fairly common in Sonoma County during fall migration, but uncommon in winter and a rare breeding species (Bolander and Parmeter, 2000). Cooper's hawk is a probable nesting species within the NSCARP project area (Burridge, 1995), and was observed during field surveys in the riparian woodland adjacent to the project site.

Loggerhead shrike is a CSC. The loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. It prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Highest density occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. It eats large insects, small birds, mammals, amphibians, reptiles, fish, carrion, and various other invertebrates. It often skewers prey on thorns, sharp twigs, wire barbs, or forces it into a crotch to feed on or to cache for feeding later. Loggerhead shrike nests are well concealed in shrubs or small trees. There are no occurrences of confirmed or probable nesting in the NSCARP project area (Burridge, 1995).

Yellow warbler is a CSC. This species is usually found in riparian deciduous habitats of cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland. It gleans and hovers in upper canopy of deciduous trees and shrubs, feeding on insects and spiders. The breeding season for this species begins in mid-April through early August with peak activity in June (Garrett and Dunn, 1981). It is a fairly common summer resident of Sonoma County (Bolander and Parmeter, 2000), and there are a number of records of possible and probable nesting records within the NSCARP project area (Burridge, 1995); however, according to the CNDDB, there are no recorded occurrences within one mile of the NSCARP project area (CNDDB, 2006).

Yellow-breasted chat is a CSC. This species breeds locally on the coast and very common inland in the summer months (Garrett and Dunn, 1981). The yellow-breasted chat inhabits riparian thickets of willow and other brushy tangles near watercourses for cover. The breeding season for this species begins in early May through early August with peak activity in June. It is an uncommon summer resident in Sonoma County, and there are probable nesting occurrences within the NSCARP project area (Burridge, 1995).

Special-Status Mammal Species

Pallid bat is a CSC and a FS and BLM Sensitive species. The species is found throughout California in habitats below 6,000 feet, msl, but has been found up to 10,000 feet in the Sierra Nevada. It typically inhabits grasslands, shrublands, woodlands, and coniferous forests in open, dry habitats that contain rocky areas for roosting. They are a year-round resident in most of their range, and hibernate in winter near their summer roost. Day roosts are usually rock crevices, tree hollows, mines, caves and a variety of human-made structures. Tree roosting occurs in conifer snags, hollows of redwoods, and cavities in oaks. Pallid bats are very sensitive to roost site disturbance. Night roosts are usually more open sites and may include open buildings, porches, mines, caves, and under bridges. Pallid bats are gregarious, roosting in colonies of 20 to several hundred individuals. Pregnant females gather in summer maternity colonies of up to several hundred females, but generally fewer than 100. Parturition occurs between May and July. Young are weaned in mid to late August with maternity bands disbanding between August and October. It is very maneuverable on the ground, and commonly feeds on Jerusalem crickets, longhorn beetles, scorpions, large moths, and grasshoppers. There are four recorded occurrences within one mile of the NSCARP project area (CNDDB, 2006).

Movement Corridors

Wildlife movement corridors are generally defined as connections between habitat patches that allow for physical and genetic exchange between otherwise isolated animal populations. Migration corridors may be local, such as those between foraging and nesting or denning areas, or they may be regional in nature. Migration corridors are not unidirectional access routes; however, reference is usually made to “source” and “receiver” areas in discussions of wildlife movement networks. “Habitat linkages” are migration corridors that contain contiguous strips of native vegetation between source and receiver areas. Linkages include riparian corridors and drainages, canyons, ridgelines, and corridors across valley floors where barriers, such as urban development, fencings, and road traffic, have not eliminated wildlife movement and plant dispersal (Sonoma County, 2005). Habitat linkages provide cover and forage sufficient for temporary habitation by a variety of ground-dwelling animal species. Wildlife migration corridors are essential to the regional fitness of an area as they provide avenues of genetic exchange and allow animals to access alternative territories as fluctuating dispersal pressures dictate.

Nine principal habitat linkages have been identified for the North Coast and Bay Area Ecoregions, which include Sonoma County (Wilderness Coalition et al, 2001). The stream channels and riparian corridors within the NSCARP project area, particularly the Russian River and Dry Creek, provide the principal corridors for the movement of terrestrial and aquatic wildlife species. The forests and woodlands at the mid- and upper levels of the foothills also provide a nearly continuously corridor for wildlife movement. Because of the low density of human occurrence, the efficacy of these corridors is enhanced. However, the agricultural fields, roads, and developed areas in the valleys limit the movement of terrestrial wildlife species.

Invasive Species

On February 3, 1999, President Bill Clinton signed Executive Order (EO) 13112 that directed federal agencies to expand and coordinate their efforts to combat the introduction and spread of plants and animals not native to the United States. The EO prohibits federal agencies from authorizing, funding, or implementing actions that are likely to cause or promote the introduction or spread of invasive species unless all reasonable measures to minimize risk of harm have been analyzed and considered. The EO established the National Invasive Species Council (NISC) and Invasive Species Advisory Committee (ISAC) to implement the EO The NISC and ISAC developed a National Invasive Species Management Plan (NISMP) to focus upon terrestrial and aquatic invasive plants, animals, and microbial organisms that cause or may cause significant negative impacts and do not provide an equivalent benefit to society. Until adoption of a national list of invasive plants is prepared by the NISC, the appropriate state list of official noxious weeds should be used.

Toward that end, the *Pest Ratings of Noxious Weed Species and Noxious Weed Seed* list prepared by the California Department of Food and Agriculture (CDFA, 2004) and the *California Invasive Plant Inventory* (California Invasive Plant Council [Cal-IPC], 2006) were reviewed. CDFA has three rating lists for noxious weeds. List A is the highest level of noxious weed. Plants should be eradicated, contained, rejected or other holding action at the state and county level. List B are plants that should be eradicated, contained, controlled, or other holding action at the discretion of the County Agricultural Commissioner. List C plants are for state-endorsed holding action and eradication only when found in a nursery, action to retard spread outside of nurseries is at the discretion of the commissioner; and plants rejected only when found in a cropseed for planting or at the discretion of the commissioner. The Cal-IPC has four listing categories: Table 1 are invasive non-native plants that threaten wildlands in California; Table 2 are species native to a part of California, but invasive in other parts of the state; Table 3 are species evaluated but not listed; and, Table 4 are species nominated but not reviewed.

In addition, staff at the Marin/Sonoma Weed Management Area was contacted to determine specific noxious weed species for the NSCARP project area, and appropriate measures to avoid or minimize impacts (L. Thomassin, pers. comm., 2006). Specific weeds of local concern include purple star-thistle, Italian thistle, French broom, Scotch broom, medusahead, cape ivy, pampas grass, barbed goatgrass, ice plant, and others.

Table 1 in Attachment 3 of Appendix F lists the category of noxious weeds identified during field surveys for the NSCARP project. No CDFA List A species were found, but a number of List B and List C species were observed. These included Italian thistle, yellow star-thistle, field bindweed, French broom, Himalayan blackberry, medusa-head, and others.

3.4.4 CEQA Thresholds of Significance Criteria

In accordance with CEQA Guidelines, and for the purposes of this analysis, the NSCARP project would be deemed to have a significant biological impact if one of the following occurs:

1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;

2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS;

3. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and/or,

6. Conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

3.4.5 Alternatives Analysis

Effects on biological resources in natural or semi-natural areas due to development take the form of direct impacts, including habitat loss and fragmentation, introduction of barriers to movement and dispersion, and conversion of native communities to developed conditions. Development may also result in indirect impacts that affect the quality of habitat on the project site and in the project area. Indirect impacts include invasion of non-native plants into natural areas; light, glare, and noise disturbances; and, declines in air and water quality.

Alternative 1 - No Project/Action

The "No Action" Alternative means that the SCWA would not implement a regional water conveyance and storage project to serve recycled water to the NSCARP area. Because no project construction or operational activities would occur, there would be no impact to biological resources as a result of implementation of Alternative 1.

Alternatives 2, 3, and 4 - Impacts Resulting from Project Construction and Operation

Impact BIO-1: Construction of the NSCARP Alternatives would result in the temporary disturbance to vegetation and wildlife.

> **Discussion:** The NSCARP project involves both the temporary disturbance and the permanent loss of habitat, both of which would affect vegetation and wildlife. Permanent losses are those in which the land use is changed for the foreseeable future, such as the construction of a pump station or reservoir. The clearing of herbaceous vegetation in grassland, ruderal lands, and some agricultural fields (excluding vineyards and orchards) for the installation of a pipeline segment would represent a temporary impact because these areas could be re-vegetated upon completion of the project and expected to recover within a five-year time frame. However, the clearing of woodlands for the installation of pipelines represents a long-term loss because even if re-vegetated upon

project completion, the extended maturation period represents a loss of habitat value for tens of years. Furthermore, access to pipelines for future maintenance would preclude the replanting of woody vegetation (e.g., trees) within a permanent access corridor.

In addition to habitat loss, ground disturbance and other construction activities would entail the use of heavy equipment and increased human presence along the construction route. This would disturb wildlife at the construction site and in adjacent habitats. Construction activities would result in mortality of less mobile species, particularly ground-dwelling (fossorial) species such as California ground squirrel, Botta's pocket gopher, and broad-footed mole. More mobile species are likely to be displaced to alternate locations, at least on a temporary basis. Once the pipeline trench is backfilled and the vegetation restored, re-occupation of the corridor is expected.

Table 3.4-1 below is a summary of cover type acreage by NSCARP structural component (e.g., pipeline, reservoir, and pump plant) and project alternative based on analysis of GIS cover type maps (Attachment 5, Appendix F).

Alternative 2

As detailed in Table 3.4-1 below, approximately 204 acres of potential habitat could be temporarily affected by pipeline installation within the 100-foot construction corridor, including staging and equipment storage areas. This acreage includes only Agricultural Lands, Annual Grasslands, and Ruderal Lands, but does not include woodland habitats (analyzed below under BIO-2), waters and wetlands (analyzed under BIO-5), or Developed Lands (e.g., roads, buildings, etc.), which provide marginal habitat. While the actual pipeline installation would only involve a small percentage of the corridor, the disturbance associated with construction could affect wildlife within the corridor.

<u>Northern Alexander Valley Subarea</u>. Approximately 102 acres of Agricultural Lands, Annual Grassland, and Ruderal Lands could be temporarily impacted during pipeline installation.

<u>Alexander Valley Subarea</u>. Approximately 12.7 acres of Agricultural Lands, Annual Grassland, and Ruderal Lands could be temporarily impacted during pipeline installation.

<u>Dry Creek Valley Subarea</u>. Approximately 12.8 acres of Agricultural Lands, Annual Grassland, and Ruderal Lands could be temporarily impacted during pipeline installation.

<u>Russian River Valley Subarea</u>. Approximately 119.02 acres of Agricultural Lands, Annual Grassland, and Ruderal Lands could be temporarily impacted during pipeline installation.

Alternative 3

Alexander Valley – Jordan Subset. Approximately seven acres of Agricultural Lands and Ruderal Lands could be temporarily affected by pipeline installation within the 100-foot construction corridor, including staging and equipment storage areas, under this alternative.

Table 3.4-1. Habitat Losses by Cover Type, Subarea, and Structural Component for the NSCARP Alternatives

Cover Type	Pipelines	Reservoirs	Pump Stations	Subtotal (Cover Type)
ALTERNATIVE 2				
Northern Alexander Valley Subarea				
Agriculture	66.59	22.48	0.12	89.19
Annual Grassland	16.42	6.27	0.06	22.75
Developed Land	148.74	0.00	0.01	148.75
Oak Forest	6.79	0.00	0.00	6.79
Oak Savanna	17.22	3.48	0.00	20.70
Oak Woodland	43.31	24.42	0.01	67.74
Mixed Evergreen Forest	0.00	18.71	0.00	18.71
Open Water	1.78	2.06	0.00	3.84
Riparian Woodland	8.77	3.01	0.00	11.78
Ruderal	19.28	0.00	0.00	19.28
Wetlands	0.00	0.00	0.00	0.00
Subtotal By Component	328.90	80.43	0.20	409.53
Alexander Valley Subarea				
Agriculture	11.15	8.74	0.00	19.89
Annual Grassland	1.58	58.25	0.00	59.83
Developed Land	10.26	0.06	0.06	10.38
Oak Forest	2.23	2.29	0.00	4.52
Oak Savanna	0.44	24.10	0.00	24.54
Oak Woodland	3.19	2.77	0.02	5.98
Mixed Evergreen Forest	0.00	0.00	0.00	0.00
Open Water	0.04	37.81	0.00	37.85
Riparian Woodland	1.09	0.61	0.00	1.70
Ruderal	0.09	0.00	0.00	0.09
Wetlands	0.00	0.00	0.00	0.00
Subtotal By Component	30.07	134.63	0.08	164.78
Dry Creek Valley Subarea				
Agriculture	11.47	12.81	0.00	24.28
Annual Grassland	1.20	15.47	0.06	16.73
Developed Land	15.99	0.00	0.06	16.05
Oak Forest	4.53	11.39	0.00	15.92
Oak Savanna	0.75	0.00	0.01	0.76
Oak Woodland	3.69	16.27	0.01	19.97
Mixed Evergreen Forest	0.10	13.21	0.00	13.31
Open Water	0.00	0.00	0.00	0.00

Table 3.4-1. Habitat Losses by Cover Type, Subarea, and Structural Component for the NSCARP Alternatives

Cover Type	Pipelines	Reservoirs	Pump Stations	Subtotal (Cover Type)
Riparian Woodland	1.10	5.28	0.00	6.38
Ruderal	0.13	0.00	0.00	0.13
Wetlands	0.00	0.00	0.00	0.00
Subtotal By Component	38.96	74.43	0.14	113.53
Russian River Valley Subarea				
Agriculture	60.03	4.52	0.00	64.55
Annual Grassland	28.52	24.21	0.00	52.73
Developed Land	82.82	0.00	0.00	82.82
Oak Forest	20.04	0.00	0.01	20.05
Oak Savanna	0.00	3.50	0.00	3.50
Oak Woodland	93.84	10.54	0.18	104.56
Mixed Evergreen Forest	0.19	0.00	0.00	0.19
Open Water	0.84	0.00	0.00	0.84
Riparian Woodland	8.99	0.00	0.00	8.99
Ruderal	1.74	0.00	0.00	1.74
Wetlands	0.22	0.04	0.00	0.26
Subtotal By Component	297.23	42.81	0.19	340.23
ALTERNATIVE 2 TOTALS	695.16	332.30	0.61	1,028.07
ALTERNATIVE 3				
Alexander Valley-Jordan Subset				
Agriculture	6.69	3.00	0.00	9.69
Annual Grassland	0.00	43.46	0.00	43.46
Developed Land	5.96	0.00	0.00	5.96
Oak Forest	1.48	0.00	0.00	1.48
Oak Savanna	0.80	6.80	0.00	7.60
Oak Woodland	2.58	0.00	0.01	2.59
Mixed Evergreen Forest	0.00	0.00	0.00	0.00
Open Water	0.03	0.00	0.00	0.03
Riparian Woodland	0.43	0.17	0.00	0.60
Ruderal	0.09	0.00	0.00	0.09
Wetlands	0.00	0.00	0.00	0.00
ALTERNATIVE 3 TOTAL	18.06	53.43	0.01	71.50
ALTERNATIVE 4				
Russian River Valley Westside Subset				
Agriculture	35.95	0.00	0.00	35.95
Annual Grassland	14.57	22.73	0.00	37.30

Table 3.4-1. Habitat Losses by Cover Type, Subarea, and Structural Component for the NSCARP Alternatives

Cover Type	Pipelines	Reservoirs	Pump Stations	Subtotal (Cover Type)
Developed Land	52.33	0.00	0.00	52.33
Oak Forest	20.04	0.00	0.01	20.05
Oak Savanna	0.00	1.25	0.00	1.25
Oak Woodland	80.99	15.00	0.12	96.11
Mixed Evergreen Forest	0.00	0.00	0.00	0.00
Open Water	0.63	0.00	0.00	0.63
Riparian Woodland	7.19	0.00	0.00	7.19
Ruderal	0.41	0.00	0.00	0.41
Wetlands	0.00	0.00	0.00	0.00
ALTERNATIVE 4 TOTAL	212.11	38.98	0.13	251.22

Alternative 4

Russian River Valley Westside Subset

Approximately 51 acres of Agricultural Lands, Annual Grassland, and Ruderal Lands could be temporarily affected by pipeline installation within the 100-foot construction corridor, including staging and equipment storage areas, under this alternative.

Impact Category: Less than significant.

CEQA Threshold of Significance Criteria: 4 and 6

Mitigation Measure BIO-1: None required. However, following construction, SCWA shall revegetate all disturbed areas with an appropriate mix of grasses and other herbaceous plant species. This will provide replacement vegetative cover and will promote the reoccupation or periodic use of these areas for nesting, cover, and foraging for wildlife. All installed vegetation will be certified free of noxious weeds.

Impact BIO-2: Construction of the NSCARP Alternatives would result in the permanent loss of native upland woodland (non-riparian) habitat

Discussion. As discussed in BIO-1 above, permanent losses are those in which the land use is changed for the foreseeable future, such as for the construction of a pump station or reservoir, or to maintain an access corridor along a pipeline route. This also includes the clearing of woodlands for the installation of pipelines because of the need to acess buried pipelines for maintenance in the future. The permanent habitat loss calculations presented in Table 3.4-1 for construction of the reservoirs, pumping stations, and the pipeline access corridor are based on the following:

- Reservoir – footprint of reservoir and bypass channel

- Distribution Pump Station – 50-foot by 50-foot area (2,500 ft^2)
- Booster Pump Station – 25-foot by 25-foot area (625 ft^2)
- Pipeline Access Corridor – 30-foot width of disturbance

Alternative 2

Northern Alexander Valley Subarea

Pipelines. Approximately 67.32 acres of oak woodland and mixed evergreen woodland occurs within the pipeline construction corridor for the NSCARP project. Of the 100-foot wide construction impact corridor, about 30 feet would need to be cleared to install the pipeline. This would result in a maximum permanent loss of approximately 20.20 acres of woodland habitat for the initial clearing and long-term maintenance of an access corridor.

Reservoirs. A maximum of 46.6 acres of woodland habitat would be permanently lost as a result of the construction and/or enlargement of the storage reservoirs for the Northern Alexander Valley Subarea.

Pump Stations. Approximately 0.01-acre of woodland habitat would be permanently lost as a result of the construction of the pump stations for the Northern Alexander Valley Subarea.

Alexander Valley Subarea

Pipelines. Approximately 5.86 acres of oak woodland and mixed evergreen woodland occurs within the pipeline construction corridor for the NSCARP project. Of the 100-foot wide construction impact corridor, about 30 feet would need to be cleared to install the pipeline. This would result in a maximum permanent loss of approximately 1.76 acres of woodland habitat for the initial clearing and long-term maintenance of an access corridor.

Reservoirs. A maximum of 29.16 acres of woodland habitat would be permanently lost as a result of the construction and/or enlargement of the storage reservoirs for the Alexander Valley Subarea.

Pump Stations. Approximately 0.02-acre of woodland habitat would be permanently lost as a result of the construction of the pump stations for the Alexander Valley Subarea.

Dry Creek Valley Subarea

Pipelines. Approximately 9.07 acres of oak woodland and mixed evergreen woodland occurs within the pipeline construction corridor for the NSCARP project. Of the 100-foot wide construction impact corridor, about 30 feet would need to be cleared to install the pipeline. This would result in a maximum permanent loss of approximately 2.72 acres of woodland habitat for the initial clearing and long-term maintenance of an access corridor.

Reservoirs. A maximum of 40.87 acres of woodland habitat would be permanently lost as a result of the construction and/or enlargement of the storage reservoirs for the Dry Creek Valley Subarea.

Pump Stations. Approximately 0.02-acre of woodland habitat would be permanently lost as a result of the construction of the pump stations for the Dry Creek Valley Subarea.

Russian River Valley Subarea

Pipelines. Approximately 114.07 acres of oak habitat and mixed evergreen woodland occurs within the pipeline construction corridor for the NSCARP project. Of the 100-foot wide construction impact corridor, about 30 feet would need to be cleared to install the pipeline. This would result in a maximum permanent loss of approximately 33.16 acres of woodland habitat for the initial clearing and long-term maintenance of an access corridor.

Reservoirs. A maximum of 14.04 acres of woodland habitat would be permanently lost as a result of the construction and/or enlargement of the storage reservoirs for the Russian River Valley Subarea.

Pump Stations. Approximately 0.19-acre of woodland habitat would be permanently lost as a result of the construction of the pump stations for the Russian River Valley Subarea.

Alternative 3

Alexander Valley-Jordan Subset

Pipelines. Approximately 4.86 acres of oak woodland and mixed evergreen woodland occurs within the pipeline construction corridor for Alternative 3. Of the 100-foot wide construction impact corridor, about 30 feet would need to be cleared to install the pipeline. This would result in a maximum permanent loss of approximately 1.2 acres of woodland habitat for the initial clearing and long-term maintenance of an access corridor.

Reservoirs. A maximum of 6.8 acres of woodland habitat would be permanently lost as a result of the construction and/or enlargement of the storage reservoirs for Alternative 3.

Pump Stations. Approximately 0.01-acre of woodland habitat would be permanently lost as a result of the construction of the pump stations for Alternative 3.

Alternative 4

Russian River Valley Westside Subset

Pipelines. Approximately 101.3 acres of oak woodland and mixed evergreen woodland occurs within the pipeline construction corridor for Alternative 3. Of the 100-foot wide construction impact corridor, about 30 feet would need to be cleared to install the pipeline. This would result in a maximum permanent loss of approximately 25.3 acres of woodland habitat for the initial clearing and long-term maintenance of an access corridor.

Reservoirs. A maximum of 16.25 acres of woodland habitat would be permanently lost as a result of the construction and/or enlargement of the storage reservoirs for Alternative 4.

Pump Stations. Approximately 0.13-acre of woodland habitat would be permanently lost as a result of the construction of the pump stations for Alternative 4.

Impact Category: Significant but Mitigable.

CEQA Threshold of Significance Criteria: 4, 5, and 6

Mitigation Measure BIO-2: To minimize impacts to native trees as a result of project construction, the following measures will be implemented by the SCWA and its contractors:

A. To the extent feasible, the SCWA shall, prior to final design, adjust alignment of pipelines, pump plants, and reservoirs to avoid and minimize the removal of native oak trees. Within proposed pipeline corridors, the construction zone is approximately 100 feet wide to accommodate alignment adjustments. Trees that are not within the construction zone, or for which removal is not necessary due to safety issues, shall be avoided;

B. Prior to project construction, SCWA shall conduct a survey to identify trees within the construction area that will be removed for pipeline installation. All native trees greater than six inches in diameter at breast height (dbh), as measured 4.5 feet above grade, will be tallied, tagged, measured, and health and vigor evaluated. Mitigation will not be required for non-native trees, nor native trees less than six inches at dbh;

C. All native trees to remain in place and located within 25 feet of ground disturbances shall be temporarily fenced by SCWA with orange plastic construction (exclusion) fencing prior to and throughout all construction activities. The exclusion fencing shall be installed six feet outside the canopy dripline of each protected tree or stand. The fencing is intended to prevent equipment operations in the proximity of protected trees that may compact soil, crush roots, or collide with the tree trunk and/or overhanging branches;

D. No construction equipment shall be parked, stored, or operated within six feet of the dripline of any protected tree;

E. SCWA or its contractor shall prepare, prior to construction, and subsequently implement following construction, a Restoration and Revegetation Plan for the project. The Plan will detail site preparation, planting techniques, watering schedules, maintenance procedures, and success criteria for installed plantings. The Plan shall include a monitoring program, and will require weekly inspection of plantings for the first month; followed by monthly monitoring for three months; and then quarterly monitoring for the next 12 months unless success criteria are met earlier. After the first year, plantings will be monitored on an annual basis for a period of four years. Monitoring will continue until performance standards are met;

F. At locations where on-site mitigation may be precluded due to restricted rights-of-way and other factors, some of the mitigation may be conducted off-site at a publicly owned park or facility, or as part of a regional habitat restoration/enhancement program.

Impact after Mitigation: Less than Significant. Implementation of the above mitigation measure would reduce the impact to a less than significant level.

Impact BIO-3: Construction of the NSCARP alternatives will result in the loss of protected oak trees

Discussion: The project would require removal of valley oak trees protected by the County's General Plan and Zoning Code; California Senate Resolution No. 17, and the California Oak Woodlands Conservation Act (SB 1334). This would be a significant impact.

Alternative 2

Northern Alexander Valley Subarea

<u>Pipelines</u>. Based on Table 3.4-1 above, approximately 67.32 acres of the pipeline corridor occurs in cover types that are either dominated by oak trees or in which oak trees are a significant associate species that could be affected by pipeline construction of this subarea.

<u>Reservoirs</u>. Approximately 27.90 acres of oak habitat could be permanently affected by construction of the reservoirs for this subarea.

<u>Pump Stations</u>. Approximately 0.01-acre of oak habitat could be permanently affected by construction of the pump stations for this subarea.

Alexander Valley Subarea

<u>Pipelines</u>. Based on Table 3.4-1 above, approximately 5.86 acres of the pipeline corridor occurs in cover types that are either dominated by oak trees or in which oak trees are a significant associate species that could be affected by pipeline construction of this subarea.

Reservoirs. Approximately 29.16 acres of oak habitat could be permanently affected by construction of the reservoirs for this subarea.

Pump Stations. Approximately 0.02-acre of oak habitat could be permanently affected by construction of the pump stations for this subarea.

Dry Creek Valley Subarea

Pipelines. Based on Table 3.4-1 above, approximately 8.97 acres of the pipeline corridor occurs in cover types that are either dominated by oak trees or in which oak trees are a significant associate species that could be affected by pipeline construction of this subarea.

Reservoirs. Approximately 27.66 acres of oak habitat could be permanently affected by construction of the reservoirs for this subarea.

Pump Stations. Approximately 0.02-acre of oak habitat could be permanently affected by construction of the pump stations for this subarea.

Russian River Valley Subarea

Pipelines. Based on Table 3.4-1 above, approximately 113.88 acres of the pipeline corridor occurs in cover types that are either dominated by oak trees or in which oak trees are a significant associate species that could be affected by pipeline construction of this subarea.

Reservoirs. Approximately 14.04 acres of oak habitat could be permanently affected by construction of the reservoirs for this subarea.

Pump Stations. Approximately 0.19-acre of oak habitat could be permanently affected by construction of the pump stations for this subarea.

Alternative 3

Alexander Valley-Jordan Subset

Pipelines. Approximately 4.9 acres of the pipeline corridor occurs in cover types that are either dominated by oak trees or in which oak trees are a significant associate species that could be affected by pipeline construction for Alternative 3.

Reservoirs. Approximately 6.8 acres of oak habitat could be permanently affected by construction of the reservoirs for Alternative 3.

Pump Stations. Approximately 0.01-acre of oak habitat could be permanently affected by construction of the pump stations for Alternative 3.

Alternative 4

Russian River Valley Westside Subset

Pipelines. Approximately 101.8 acres of the pipeline corridor occurs in cover types that are either dominated by oak trees or in which oak trees are a significant associate species that could be affected by construction of Alternative 4.

Reservoirs. Approximately 16.25 acres of oak habitat could be permanently affected by construction of the reservoirs for Alternative 4.

Pump Stations. Approximately 0.13-acre of oak habitat could be permanently affected by construction of the pump stations for Alternative 4.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 5

Mitigation Measure BIO-3: To minimize impacts to native oaks trees as a result of project construction, the following measures will be implemented by the SCWA and its contractors:

A. Implement Mitigation Measure BIO-2 ; and,

B. Following construction, SCWA shall replace each valley oak tree removed and/or substantially damaged as a result of project construction in accordance with Section 26-67-0303 of the Sonoma County Zoning Code.

Impact after Mitigation: Less than Significant. Implementation of the above mitigation measures would reduce the impact to a less than significant level due to replacement of trees removed.

Impact BIO-4: Construction of the NSCARP alternatives could impact protected raptors and other bird species during nesting.

Discussion: Trees located within the project area provide potential nest sites for raptors such as osprey, Cooper's hawk, sharp-shinned hawk, white-tailed kite, great horned owl, red-shouldered hawk, northern harrier, and red-tailed hawk. Removal of any trees with active nests within the project area, construction activities conducted in the vicinity of potential nest trees, or ground-clearing activities could potentially impact nesting raptors and other bird species that are protected under the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711) and/or California Fish and Game codes (Sections 3503, 3503.5, and 3800). These laws and regulations prohibit the take, possession, or destruction of birds, their nests, or eggs. Disturbance that causes nest abandonment and/or loss of reproductive effort could be considered a "take".

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 1

Mitigation Measure BIO-4: SCWA shall schedule tree removal and ground-clearing activities prior to the initiation of nesting activity (March) or after fledging (August). If this is infeasible, SCWA shall conduct pre-construction surveys between February 15 and August 15 in potential nesting habitat to identify nest sites. If an active raptor nest is observed within 350 feet of the project site, SCWA shall contact CDFG and establish an appropriate protective buffer around the nest tree and prohibit construction activities in the buffer zone until the young have fledged.

Impact after Mitigation: Less than Significant. Implementation of the above mitigation measures would reduce the impact to a less than significant level due to the assurance that potential habitat is not inhabited during removal.

Impact BIO-5: Construction of the NSCARP alternatives would result in the loss or degradation of wetlands and other waters

Discussion. The project would result in the temporary disturbance and the permanent loss of waters and wetlands regulated by the Corps of Engineers under Section 404 of the Clean Water Act and/or the CDFG under Section 1600 of the California Fish and Game Code. These would constitute significant impacts.

Based on field surveys and an analysis of project cover type maps (Attachment 5, Appendix F) and USGS topographic maps, the categories of potentially regulated waters and wetlands include creek channels, open water (e.g., existing ponds and reservoirs), riparian woodlands, and wetlands. Table 3.4-2 is a summary of habitat acreage affected by reservoirs, pipelines, and pump stations, and Table 3.4-3 is a list of the potential stream channels, ditches, and swales that could be crossed by pipelines or affected by construction of reservoirs and/or pump stations.

Table 3.4-2
Riparian, Wetland, and Aquatic Habitat Acreage Affected by Proposed NSCARP by Structural Component, Reservoir, and Subarea

Structural Component	Channel (acres)	Open Water (acres)	Riparian (acres)	Wetland (acres)
Northern Alexander Valley Subarea				
Reservoirs				
Bilbro-Bioca	0.30	0.00	0.00	0.00
Todd	0.00	2.06	0.00	0.00
Klein Foods	0.13	0.00	3.01	0.00
Gallo Asti	0.00	0.00	0.00	0.00
Pipelines	1.52	1.78	8.77	0.00
Pump Stations	0.00	0.00	0.00	0.00
Subtotal	1.95	3.84	11.78	0.00
Alexander Valley Subarea				
Reservoirs				
Jordan A	0.25	0.00	0.00	0.00
Jordon C	0.26	0.00	0.20	0.00

Table 3.4-2
Riparian, Wetland, and Aquatic Habitat Acreage Affected by Proposed NSCARP by Structural Component, Reservoir, and Subarea

Structural Component	Channel (acres)	Open Water (acres)	Riparian (acres)	Wetland (acres)
Lytton	0.04	30.10	0.00	0.00
Existing T-Bar-T	0.04	2.85	0.44	0.00
Proposed T-Bar-T	0.10	0.00	0.00	0.00
Robert Young Home	0.00	4.89	0.00	0.00
Pipelines	1.35	0.04	1.09	0.00
Pump Stations	0.00	0.00	0.00	0.00
Subtotal	2.04	37.88	1.73	0.00
Dry Creek Valley Subarea				
Reservoirs				
Passalacqua	0.40	0.00	2.30	0.00
Kuimelis No. 1	0.22	0.00	2.98	0.00
Kuimelis No. 2	0.10	0.00	2.07	0.00
Pipelines	2.39	0.00	1.10	0.00
Pump Stations	0.00	0.00	0.00	0.00
Subtotal	3.11	0.00	8.45	0.00
Russian River Valley Subarea				
Reservoirs				
Russell-Bucher	0.14	0.00	0.00	0.00
Bucher	0.12	0.00	0.00	0.00
Becnel No. 2	0.13	0.00	0.00	0.00
J Wine	0.07	0.00	0.00	0.04
Denner Ranch	0.04	0	0	0
Pipelines	1.26	0.84	8.99	0.22
Pump Stations	0.00	0.00	0.00	0.00
Subtotal	1.76	0.84	8.99	0.26
TOTAL BY STRUCTURE				
Reservoirs	2.34	39.90	11.00	0.04
Pipelines	6.52	2.66	19.95	0.22
Pump Stations	0.00	0.00	0.00	0.00
GRAND TOTAL	8.86	42.56	30.95	0.26
TOTAL BY ALTERNATIVE				
Alternative 2	8.86	42.56	30.95	0.26
Alternative 3	0.26	0.30	0.63	0.00
Alternative 4	0.81	0.67	7.19	0.00

Table 3.4-3
Proposed NSCARP Channel Crossing by Subarea and Pipeline Node

Node	Channel	Tributary
Alexander Valley Subarea		
Node 26-27	Unnamed intermittent watercourse	Russian River
Node 50-51	Unnamed intermittent watercourse	Grid Creek/Russian River
Node 14-16	Unnamed intermittent watercourse	Russian River
Node 14-16	Unnamed intermittent watercourse	Russian River
Node 23-50	Grid Creek.	Russian River
Node 13-14	Unnamed intermittent watercourse	Russian River
Node 22-48	Grid Creek.	Russian River
Node 30-31	Unnamed intermittent watercourse	Russian River
Node 9-13	Unnamed intermittent watercourse	Russian River
Node 9-10	Unnamed ditch	Lytton Creek/Russian River
Node 22-48	Unnamed ditch	Russian River
Node 9-46	Lytton Creek	Lytton Lake to Russian River
Node 46-47	Lytton Creek	Lytton Lake to Russian River
Node 28-33	Sausal Creek	Russian River
Node 1-48	Russian River	Russian River
Node 33-35	Unnamed intermittent watercourse	Russian River
Node 46-47	Lytton Creek	Lytton Lake to Russian River
Node 36-37	Hoot Owl Creek	Russian River
Node 4-6	Unnamed intermittent watercourse	Unknown (near Jordan A)
Node 3-7	Unnamed intermittent watercourse	Russian River
Node 4-5	Unnamed intermittent watercourse	Russian River
Node 7-8	Unnamed intermittent watercourse	Russian River
Dry Creek Subarea		
Node 19-20	Schoolhouse Creek	Dry Creek
Node 19-20	Unnamed intermittent watercourse	Dry Creek
Node 19-20	Dutcher Creek	Dry Creek
Node 23-24	Fall Creek	Dry Creek
Node 18-19	Unnamed intermittent watercourse	Dry Creek
Node 22-23	Pena Creek	Dry Creek
Node 18-21	Unnamed intermittent watercourse	Dry Creek
Node 18-21	Dry Creek	Russian River
Node 17-18	Unnamed intermittent watercourse	Dry Creek
Node 16-21	Unnamed intermittent watercourse	Dry Creek

Table 3.4-3
Proposed NSCARP Channel Crossing by Subarea and Pipeline Node

Node	Channel	Tributary
Node 16-21	Unnamed intermittent watercourse	Dry Creek
Node 17-18	Unnamed intermittent watercourse	Dry Creek
Node 16-21	Unnamed intermittent watercourse	Dry Creek
Node 14-17	Unnamed intermittent watercourse	Dry Creek
Node 16-21	Unnamed intermittent watercourse	Dry Creek
Node 16-21	Unnamed intermittent watercourse	Dry Creek
Node 14-17	Unnamed intermittent watercourse	Dry Creek
Node 14-17	Unnamed intermittent watercourse	Dry Creek
Node 14-17	Unnamed intermittent watercourse	Dry Creek
Node 15-16	Grape Creek	Dry Creek
Node 14-15	Dry Creek	Dry Creek
Node 13-14	Unnamed intermittent watercourse	Dry Creek
Node 12-15	Crane Creek	Dry Creek
Node 13-14	Unnamed intermittent watercourse	Dry Creek
Node 13-14	Unnamed intermittent watercourse	Dry Creek
Node 12-15	Kelley Creek	Dry Creek
Node 12-15	Unnamed intermittent watercourse	Dry Creek
Node 12-15	Unnamed intermittent watercourse	Dry Creek
Node 1-13	Unnamed intermittent watercourse	Dry Creek
Node 12-28	Unnamed intermittent watercourse	Dry Creek
Node 1-2	West Slough	Dry Creek
Node 2-7	Dry Creek	Russian River
Node 7-8	Unnamed intermittent watercourse	Dry Creek
Node 3-5	West Slough	Dry Creek
Node 8-10	Unnamed intermittent watercourse	Dry Creek
Node 10-11	Fetta Creek/Wallace Creek.	Dry Creek
Russian River Valley		
No node	Russian River	Russian River
Node 3-4	Unnamed intermittent watercourse	Russian River
Node 10-11	Unnamed intermittent watercourse	Russian River
Node 1-2	Unnamed intermittent watercourse	Russian River
Node 1-2	Unnamed intermittent watercourse	Russian River
Node 8-9	Unnamed intermittent watercourse	Russian River
Node 8-9	Unnamed intermittent watercourse	Russian River
Node 15-16	Unnamed intermittent watercourse	Russian River

Table 3.4-3
Proposed NSCARP Channel Crossing by Subarea and Pipeline Node

Node	Channel	Tributary
Node 1-8	Russian River	Russian River
Node 8-18	Unnamed intermittent watercourse	Russian River
Node 18-19	Unnamed intermittent watercourse	Russian River
Node 19-20	Porter Creek	Russian River
Node 19-20	Porter Creek	Russian River
Node 21-23	Russian River	Russian River
Node 23- 25	Mark West Creek	Russian River
Node 33-35	Mark West Creek	Russian River
Node 36-37	Windsor Creek tributary	Russian River
Node 36-37	Windsor Creek tributary	Russian River
<u>Northern Alexander Valley Subarea</u>		
Node 17-25	Unnamed intermittent watercourse	Russian River
Node 13-16	Unnamed intermittent watercourse	Russian River
Node 23-25	Unnamed intermittent watercourse	Russian River
Node 13-16	Unnamed intermittent watercourse	Russian River
Node 23-25	Crocker Creek	Russian River
Node 13-14	Barrelli Creek	Russian River
Node 12-13	Barrelli Creek	Russian River
Node 12-13	Unnamed intermittent watercourse	Russian River
Node 23-25	Russian River	Russian River
Node 9-23	Unnamed intermittent watercourse	Russian River
Node 9-22	Unnamed intermittent watercourse	Russian River
Node 9-22	Unnamed intermittent watercourse	Russian River
Node 4-5	Gritt Creek.	Russian River
Node 9-22	Unnamed intermittent watercourse	Russian River
Node 2-22	Wood Creek	Russian River
Node 3-4	Unnamed intermittent watercourse	Russian River
Node 3-7	Unnamed intermittent watercourse	Russian River
Node 2-3	Russian River	Russian River
Node 3-7	Miller Creek	Russian River
Node 1-2	Peterson Creek	Russian River

Alternative 2

Pipelines. Alternative 2 will involve the crossing of approximately 100 channels, most of which are unnamed intermittent or ephemeral channels to Dry Creek, mainstem Russian River, Wallace Creek, Grid Creek, Mark West Creek, and others (see Table 3.4-3) for the installation of approximately 108 miles of pipe. This alternative has the potential to adversely affect 6.52 acres of stream channels, 2.66 acres of open water areas, 0.26-acre of wetlands, and 19.95 acres of riparian habitat. Adverse effects include clearing of vegetation, modification of the slope and hydroperiod through the placement of fill, and degradation of water quality. Impacts to areas dominated by herbaceous vegetation are likely to be temporary in nature due to the ability to restore disturbed habitat within three to five years. Impacts to wooded riparian areas will result in permanent losses because of the prolonged time necessary for plantings to mature.

Reservoirs. All reservoirs will be off-line so that no natural runoff would be captured in any of the reservoirs. This is necessary to comply with Title 22 prohibiting the mixing of recycled water and surface waters. In those situations where the reservoir is to be constructed within an intermittent or ephemeral drainage, a channel will be constructed that will divert flows around the reservoir and back into the natural drainage. Alternative 2 will involve the construction of 17 new storage reservoirs and the enlargement of four existing reservoirs. Of the new storage reservoirs, one would be an off-stream excavation and not involve any regulated waters. Of the existing reservoirs, three are off-stream and enlargement would not affect any tributary streams. For the 16 new reservoirs and expansion of the existing reservoirs, approximately 2.3 acres of stream channel, 11 acres of riparian habitat, and 0.04-acre of seasonal wetlands would be permanently lost. The 42.35 acres of open water habitat within the existing reservoirs would increase to approximately 290 acres.

Pump Stations. Alternative 2 would involve the construction of 16 pump stations, but would not involve the loss of regulated waters or wetlands.

Alternative 3

Pipelines. Alternative 3 will involve the crossing of three channels (two intermittent and the mainstem Russian River) for the installation of approximately 16.7 miles of pipe. This alternative has the potential to adversely affect 0.26-acre of stream channels, 0.3-acre of open water areas, and 0.63-acre of riparian habitat. Adverse effects include clearing of vegetation, modification of the slope and hydroperiod through the placement of fill, and degradation of water quality. Impacts to areas dominated by herbaceous vegetation are likely to be temporary in nature due to the ability to restore disturbed habitat within three to five years. Impacts to wooded riparian areas will result in permanent losses because of the prolonged time necessary for plants to mature.

Reservoirs. Alternative 3 will involve the construction of two new storage reservoirs, which would result in the loss of 0.51-acre of stream channel, 0.3-acre of open water, and 0.63-acre of riparian habitat.

Pump Stations. Alternative 3 would not involve the loss of regulated waters or wetlands.

Alternative 4

Pipelines. Alternative 4 will involve the crossing of 10 channels, most of which are unnamed intermittent or ephemeral channels to Porter Creek, Mark West Creek, and the mainstem Russian River for the installation of approximately 11.1 miles of pipe. This alternative has the potential to adversely affect 0.81-acre of stream channels, 0.67-acre of open water areas, and 7.19 acres of riparian habitat. Adverse effects include clearing of vegetation, modification of the slope and hydroperiod through the placement of fill, and degradation of water quality. Impacts to areas dominated by herbaceous vegetation are likely to be temporary in nature due to the ability to restore disturbed habitat within three to five years. Impacts to wooded riparian areas will result in permanent losses because of the prolonged time necessary for plants to mature.

Reservoirs. Alternative 4 will involve the construction of two new storage reservoirs, which would result in the loss of 0.39-acre of stream channel, 0.67-acre of open water, and 7.19 acres of riparian habitat.

Pump Stations. Alternative 4 would not involve the loss of regulated waters or wetlands.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criteria: 3, 5, and 6

Mitigation Measure BIO-5: SCWA shall implement the following measures to avoid, minimize, reduce and/or compensate for impacts to waters and wetlands:

A. For pipeline crossings of channels, wetlands, and other regulatory waters, the SCWA shall use trenchless construction methods (e.g., jack-and-bore, horizontal directional drilling [HDD], or suspension on an existing bridge;

B. Silty or turbid water produced from pipeline construction activities shall not be discharged directly into streams. Instead, any water impounded between the dams and/or underflow seepage into the work site will be pumped into an upland containment area where the water will be allowed to percolate into the soil and not mix with channel flows;

C. SCWA shall secure applicable permits from CDFG, the Corps, and RWQCB before initiating construction in area requiring permits from these agencies;

D. A compensatory mitigation ratio (replacement-to-loss) for the temporary and permanent impacts shall be a minimum of 1:1 to assure no net loss. Potential mitigation strategies include: 1) the purchase of mitigation credits at an approved Wetland Mitigation Bank; 2) contribution of *in-lieu* fees for a regionally approved riparian and/or wetland creation or restoration project; and, 3) development of compensatory mitigation wetlands and riparian areas at project sites. Compensatory mitigation shall be subject to the approval of the Corps, CDFG, and RWQCB, and consistent with standards pertaining to mitigation type, location, and replacement-to-loss ratios.

E. Diversion channels shall be constructed prior to the placement of fill material into natural channels for reservoir construction to prevent unexpected flows from entering the reservoir; and,

F. The diversion channels shall be constructed in upland areas and in a manner to allow the establishment of vegetation similar to that of the natural channel being replaced. This will partially offset a portion of the loss of natural channel vegetation from reservoir construction, and provide a site for compensatory mitigation.

Impact after Mitigation: Less than Significant. Implementation of the above mitigation measures would reduce the impact to a less than significant level due to replacement/restoration of affected areas.

Impact BIO-6: Construction of the NSCARP alternatives could impact special-status species and/or adversely effect designated critical habitat.

Discussion. Project implementation could result in temporary and permanent adverse effects to special-status species, including species listed as threatened and/or endangered under FESA and CESA. Figures 3.4-1 through 3.4-4 depict the locations of special-status species within one mile of the NSCARP project. A general description of these species are included above, and an analysis of a species likelihood of occurrence within specific NSCARP impact zones is included in Attachment 4 of Appendix F. The likelihood of occurrence analysis is based on geographic and elevational distribution of the species, and the presence of suitable habitat at specific project nodes.

Alternative 2

A total of 85 special-status species have been reported from the different USGS quadrangles encompassing the NSCARP project area. Of those, 28 species have been reported within one mile of a NSCARP component and one species was observed during field surveys. As shown below, these include seven listed species (SE, SR, FE, FT), 10 CNPS-designated plant species, and nine CSC:

Plants	Protected Status
Baker’s navarretia	1B
Burke’s goldfields	SE, FE
Dwarf downingia	List 2
Fragrant fritillary	1B
Many-flowered navarretia	SE, FE
Marsh microseris	1B
Narrow-anthered California brodiaea	1B
Pennell’s bird’s-beak	SR, FE
Rincon manzanita	1B
Rincon Ridge ceanothus	1B
Robust monardella	1B

Plants	**Protected Status**
Sebastopol meadowfoam	SE, FE
Serpentine daisy	1B
Thin-lobed Horkelia	1B
Vine Hill clarkia	SE, FE
Vine Hill manzanita	SE, 1B
Fish	
Chinook salmon (California Coastal ESU)	FT
Coho salmon (Central California ESU)	FE
Steelhead (Central California Coast DPS)	FT
Navarro roach	CSC
Russian River tule perch	CSC
Amphibians	
California tiger salamander (within three miles)	FT, CA Candidate
Foothill yellow-legged frog	CSC
Reptiles	
Northern Pacific pond turtle	CSC
Birds	
Osprey	CSC
White-tailed kite	CFP
Northern harrier	CSC
Cooper’s hawk	CSC
Mammals	
Pallid bat	CSC

Special-Status Plant Species. Construction of reservoirs, pipelines, and pump stations has the potential to adversely affect listed plant species, particularly the vernal pool species occurring within the Sonoma County Airport and Denner Ranch portions of the NSCARP project area within the Santa Rosa Plain (*e.g.*, Burke’s goldfields, many-flowered navarretia, Sebastopol meadowfoam, and dwarf downingia).

Special-Status Fish Species. Construction of the reservoirs, pipelines, and pump stations are not likely to adversely affect fish species occurring within the NSCARP project area because no work will be conducted in rivers and streams in which these species occur. Pipeline will be installed by suspending on existing bridges or by jack-and-bore and/or horizontal directional drilling methods. These latter methods would occur below the bed of the channels and result in no impact to aquatic species unless a frac-out was to occur. A frac-out, in which the drilling muds could enter a live stream via fissures in the substrate between the channel bed and bore, would release drilling muds into the river, which would increase turbidity and, depending on the volume of release, cover the channel bed with bentonite and other compounds.

The operation of the NSCARP project is not expected to result in any adverse effect to special-status fish species because the recycled water from the pipelines and reservoirs would not enter any natural waterbodies. In the event of a catastrophic failure of an impoundment, it is possible that recycled water could enter a natural waterway; however, based on the results of the analyses conducted for the City of Santa Rosa's Incremental Water Recycling Program, the quality of the water is not likely to adversely affect aquatic and/or terrestrial species (see Impact Bio-8 below). Further, natural flows will not be impeded by the reservoirs because flow would be diverted around the reservoirs and returned to the natural channel downstream of the impoundment. As such, there would be no diminution of flows or change in the timing of flows.

Special-Status Amphibian Species. Construction of the reservoirs, pipelines, and pump stations could result in adverse effects on special-status amphibian species, particularly California tiger salamander, which occurs within the Santa Rosa Plain. Construction in uplands could disturb potential aestivation habitat for CTS. Construction of the reservoirs in natural drainages could adversely affect foothill yellow-legged frog habitat. Over the long term, construction of new reservoirs would increase the acreage of ponded habitat, and could provide potential new breeding and over-summering locations for amphibians.

Special-Status Reptile Species. The Northern Pacific pond turtle could be affected by pipeline and reservoir construction in natural drainages and by the expansion of existing reservoirs. However, construction of new reservoirs would increase the acreage of ponded habitat available to the pond turtle.

Special-Status Bird Species. The clearing of riparian and oak woodlands would result in the loss of potential breeding and foraging habitat for osprey, Cooper's hawk, sharp-shinned hawk, yellow warbler, and other special-status bird species.

Special-Status Mammal Species. Construction activities such as stringing pipeline segments on existing bridges and removal of riparian and oak woodland stands could potentially affect special-status bat roosts and maternal colonies.

Alternative 3

Three special-status species have been reported within one mile of this alternative. These species include the foothill yellow-legged frog (CSC), Northern Pacific pond turtle (CSC), and Burke's goldfields (SE, FE).

Alternative 4

Seven special-status species have been reported within one mile of the alternative. These species include serpentine daisy (1B), Pennell's bird's-beak (SR, FE), foothill yellow-legged frog (CSC), Northern Pacific pond turtle (CSC), Rincon Ridge ceanothus (1B), osprey (CSC), and Vine Hill manzanita (SE).

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criteria: 1 and 6

Mitigation Measure BIO-6: SCWA shall implement the following impact minimization and avoidance measures to reduce or compensate for impacts to special-status species:

A. Prior to construction, there will be consultation with USFWS, NOAA Fisheries, and CDFG under FESA and CESA to secure proper authorization in the event of an " incidental take" of a listed species is anticipated;

B. A minimum of one year prior to construction activities, field surveys will be conducted at each project site to determine the presence of special-status species and/or suitable habitat. All surveys will be conducted in accordance with approved survey protocols;

C. If surveys identify the presence of special-status species at a project site, the following will be implemented:

   a. If feasible, the construction area will be adjusted to avoid impacts to special-status species and habitat. The adjusted alignment will be within the project area, and will include appropriate buffers between the species' occurrence or habitat and the construction area.

   b. If adjustment of the construction area is not feasible, there will be consultation with USFWS, NOAA Fisheries, and CDFG to develop species-specific measures to minimize the effects of construction and operation of the NSCARP project. This may include: seasonal construction restrictions, such as during the active nesting or rearing season of protected birds and bats, respectively; erection of protective barriers; collection and relocation of individuals; site monitoring during construction; site restoration; and, implementation of construction practices that would avoid specific areas, such as horizontal directional drilling, suspension of pipelines on existing bridges, etc.

   c. If there is no feasible alternative to the disturbance to special-status species or habitat, SCWA will compensate for any loss of special-status species habitat through a combination of the following:

      - *creation of replacement habitat*
      - *habitat preservation through Conservation Easement*
      - *acquisition of credits at an approved mitigation bank*
      - *in-lieu contribution to a regional habitat restoration fund, and/or*
      - *other compensatory measures that are deemed acceptable by the USFWS, NOAA Fisheries, and CDFG.*

D. Any project component that would jeopardize the continued existence of a listed species will be eliminated from consideration.

E. The SCWA will prepare and implement Frac-out Plan as detailed in Section 2.4 in the event horizontal directional drilling is proposed for any river crossing.

Impact after Mitigation: Less than Significant. Implementation of the above mitigation measures would reduce the impact to a less than significant level.

Impact BIO-7: Construction of the recycled water reservoirs can increase ecological risk to animals and plants exposed to organic and inorganic compounds potentially occurring in treated wastewater (e.g., chronic toxicity and bioaccumulation).

Discussion. The proposed reservoirs, like wastewater treatment ponds, provide the opportunity for wildlife to come into contact with treated water (Andersen et al., 2003; Frederick and McGehee, 1994); Knight, 1997; Piest and Sowls, 1985; Reeve, 2006; and Swanson, 1977). However, at the NSCARP reservoirs, all waters would be tertiary-treated recycled water that meets DHS criteria as specified in Title 22. Furthermore, on the basis of an extensive Ecological Risk Assessment (ERA) conducted by the City of Santa Rosa as part of the Incremental Recycled Water Program (City of Santa Rosa, 2003), no organic substances were identified from the Laguna WWTP as a potential concern to terrestrial or aquatic biological communities exposed to the recycled water. The study identified copper and cyanide as inorganic chemicals that could pose a potential hazard to aquatic organisms, and aluminum as a potential hazard to animals that might eat fish exposed to recycled water. The ERA concluded that no significant risk was identified for direct exposure of terrestrial organism to organic chemicals and metals found at detectable levels in the recycled water or in the sediment, and all Environmental Quotients (EQs) were below significance levels (e.g., < 10). For aquatic organisms, no significant risk was found for organic or inorganic chemicals, except copper. The EQ for copper in recycled water was determined to be 1.1. The EQ was based on the maximum detected concentrations; consequently, the risk estimates overestimate the likelihood that ecological receptors would be adversely affected. The report concluded that because the EQ of copper was for the maximum concentration rather than the average, and would be diluted upon entry into another surface waterbody, copper would not pose a significant ecological hazard to aquatic receptors.

For the minimum recycled water hardness, the copper criterion in recycled water for the ERA is 6.6 ug/l, and 13.2 ug/l for the median hardness. Based on the City's recycled water sampling, the median copper concentration is 9.4 ug/l, and the maximum concentration is 22 ug/l. However, only 11 of 124 samples (*e.g.,* 8.8 percent) exceeded the 13.2 ug/l concentration (D. Smith, pers. comm., 2006).

The 2003 ERA is currently being revised, but will not be issued until after this draft EIS/R is released. Consequently, EIS/R preparers discussed preliminary findings of the revised ERA with City of Santa Rosa consultants (Pat Collins, Winzler & Kelly and Tony Gendusa, CDM, pers. comm., February 2, 2007). Based on those discussions, it was confirmed that organics and most inorganics, with the exception of copper and cyanide, were below the screening level (E.Q. < 1), and did not represent risks to terrestrial or aquatic species. Copper continues to be found at levels marginally above EQ 1 and, therefore, represents a low risk of harm to aquatic organisms exposed to the tertiary treated recycled water. Cyanide, however, was found between EQ 8 and 9, which was much higher than reported in the 2003 ERA. The high levels have been shown to be due to sample preservation techniques. Because the EQ is below 10, the cyanide levels represent a low risk of harm to aquatic organisms exposed to the tertiary treated recycled water. The recent data has also shown that aluminum concentrations are no longer elevated in the effluent. Further, aluminum in fish tissue is no longer considered a risk because of the low bioaccumulation potential and lack of evidence of adverse effects on piscivorous predators.

Consequently, the occasional exceedance of the level of copper and cyanide entering the reservoirs is not expected to significantly affect aquatic organisms for the following reasons: First, the levels of copper at maximum concentrations exceed standards marginally, and the overall levels from the Laguna Plant have been decreasing between 1996 and 2002 (see Table 3.13-5 in Section 3.13 – Health and Human Safety). Second, maximum concentrations are likely to occur on an infrequent basis, less than 10 percent of the time. Third, upon introduction into the reservoirs, the levels of copper and cyanide would likely be diluted to levels below indicator-thresholds as referenced in the ERA. Fourth, the reservoirs will be off-line with no direct connection to a natural waterbody. Finally, the situations in the reservoirs would mimic that which occurs on a perennial basis at holding ponds at the Airport-Larkfield-Wikiup WWTP and Laguna WWTP, which are used by a number of waterfowl, wading birds, and aquatic species.

Impact Category: Less than Significant

CEQA Threshold of Significance Criteria: 3 and 5.

Mitigation Measures: None required.

Impact BIO-8: Construction of the recycled water reservoirs can potentially increase ecological risk to animal and plant populations exposed to endocrine disrupting compounds.

Discussion: As detailed in Chapter 3.13, Public Health and Safety, endocrine disrupting compounds (EDC's) have been suggested as agents responsible for declines in the reproductive success and sexual development of wildlife. EDCs include organochlorine pesticides, polychlorinated biphenyls (PCBs), dioxins, triazine herbicides, carbamate pesticides, alkylphenolic compounds, synthetic estrogens, and metals. Further, low concentrations of EDCs have been reported in the effluent from the Laguna Plant (e.g., endosulfan, lindane, and lead). However, there are a number of other potential EDCs, like alkylphenols, which are degradation products of personal care products, and pharmaceuticals, that are likely present in the wastewater effluent at very low concentrations, but for which testing is not currently performed (City of Santa Rosa, 2003).

In its report entitled, "*Global Assessment of the State-of-the-Science of Endocrine Disruptors*", the World Health Organization's (WHO) International Programme on Chemical Safety (IPSC, 2002) reported that there is strong evidence that certain effects observed in wildlife can be attributed to substances that function as EDCs. The report noted, however, there are a large number of situations where the evidence of a causal link is weak or nonexistent. In those instances where a response can be attributed to EDCs, the species inhabiting the area received extensive chemical contamination. Questions remain whether low levels of EDCs pose substantial risks to wildlife (IPSC, 2002).

Some EDCs are regulated by water quality standards or drinking water standards based on toxicological and carcinogenic effects. However, neither the federal government or State of California have set criteria for natural or synthetic estrogens or related pharmaceutical chemicals, and no draft or proposed standards are under consideration. Further, tests are not routinely performed on a number of compounds that may functions as EDCs. Consequently, assessing the impacts on fish and wildlife potentially exposed to EDCs as a result of NSCARP is problematic.

A number of factors would suggest that the effect of NSCARP would be minimal with regards to exposing fish and wildlife to these compounds:

First, there would be no change in the volume of the treated water, but a change in the location of the storage. Rather than being stored at the Laguna, Airport-Larkfield-Wikiup, and Windsor facilities, the water would be stored at smaller reservoirs. This would result in the recycled water being distributed to a wider geographic area, but affect a smaller population of fish and aquatic organisms due to the lack of suitable aquatic habitat at most of the sites. It could affect a larger population of terrestrial wildlife because of the increased upland areas affected. However, the water would be contained in much smaller reservoirs than at the treatment facilities, and would likely attract smaller concentrations of wildlife.

Second, by pumping the recycled water to the storage reservoirs and by applying the water to crops, the volume of treated water entering the aquatic system directly would be reduced, and fish and wildlife in the natural systems would be exposed to reduced concentrations of compounds. Also, the suite of fish species potentially occurring in the storage reservoirs would be different from those in the natural stream systems, particularly the larger rivers and streams. The reservoirs would not provide suitable habitat for native salmonids or other special-status fish species.

Third, recycled water applied to the fields will evaporate, percolate into soil, or be taken up by the plants. This sequestration would limit exposure to fish and wildlife from direct discharge into open waters. Further, exposure of the recycled water to soil may increase biodegradation and/or adsorption of EDCs and xenobiotics to organic matter, thereby reducing concentrations and availability to fish and wildlife.

Impact Category: In accordance with Section 15145 of the State CEQA Guidelines, the impact of EDCs on fish and wildlife from operation of NSCARP is too speculative to be reasonably reached because: 1) no evidence of systemic effect on local fish and wildlife populations; 2) low concentrations of suspected EDCs for which testing is performed (e.g., lindane, endosulfan, and lead); 3) lack of regulatory criteria with which to evaluate effluent concentrations of EDCs on fish and wildlife; and, 4) research on the subject is on-going and the subject is not well understood at this point in time. As such, no impact conclusion can be made based on the current state-of-the-science on the issue.

CEQA Threshold of Significance Criterion: N/A

Mitigation Measure BIO-8: Because of the evolving research on the issue of EDCs and xenobiotics, SCWA will perform the following:

- Monitor on-going research to stay abreast of the state-of-the-science concerning EDCs and xenobiotics;

- Consult and coordinate with the Regional Water Quality Control Board, USEPA, and other regulatory agencies on developing standards and promulgating regulations;

- Implement appropriate treatment technologies as required by regulatory agencies; and,

- Formulate and implement adaptive management procedures to respond to changes in regulations.

- Encourage public awareness of recent federal guidelines concerning the proper disposal of prescription drugs, such as take-back programs, disposing down toilet or sink only if so labeled, etc. (Office of National Drug Control Policy, 2007).

Impact BIO-9: The NSCARP alternatives could potentially block or disturb major migration corridors between resource areas for native animals.

All Alternatives

Discussion: Construction of pipelines, reservoirs, and pump stations will result in the temporary disturbance of the movement of terrestrial species due to equipment operations in or near channels and other native cover types. Because the pipelines will be buried and pump stations sited in previously disturbed areas, no long-term impacts to migratory corridors are expected from these components. The construction of the reservoirs will be largely conducted in natural drainages, which will be permanently blocked, and could adversely affect terrestrial and aquatic movements. However, while the natural channel will be blocked, new diversion channels will be constructed at each reservoir that will provide a replacement corridor. In addition, the reservoirs may provide the added benefit of perennial aquatic habitat, which could provide roosting, cover, and foraging habitat to wildlife as is presently occurring at recycled water ponds at the City of Santa Rosa's Laguna Wastewater Treatment Plant and SCWA's Airport-Larkfield-Wikiup Wastewater Treatment Facility in Windsor.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 4

Mitigation Measure BIO-9: Implement Mitigation Measure BIO-5F.

Impact after Mitigation: Less than Sigificant. Impacts to migration corridors would be less than significant with incorporation of the above-reference mitigation measure.

Impact BIO-10: The NSCARP alternatives could potentially cause a decrease in stream flows, affecting aquatic habitat and its inhabitants downstream from a dam.

Discussion: The reservoirs will be off-line structures. Natural stream flows and surface water runoff will be diverted around the reservoirs. As such, there will not be a decrease in downstream flows, and aquatic habitat will not be adversely affected.

NSCARP would result in fewer agricultural diversions from the Russian River and its tributaries, which would enable the SCWA to release less water from storage in Lake Mendocino and Sonoma to meet water demands and instream flow requirements. This would result in more water being conserved in storage in these reservoirs, which would provide more operational flexibility for the SCWA to benefit fisheries sources in the Russian River.

Impact Category: Less than Significant

Threshold of Significance Criterion: 4

Mitigation Measures: None required.

3.5 CULTURAL RESOURCES

3.5.1 Introduction

This section considers and evaluates the potential impacts of the proposed project on cultural and paleontological resources. Cultural resources include historic buildings and structures, historic districts, historic resources sites, prehistoric and historic archaeological sites, and other prehistoric and historic objects and artifacts. Paleontological resources include vertebrate, invertebrate, or plant fossils. This EIR/EIS utilizes technical information and analyses from previous studies which is supported by the State CEQA Guidelines (see Sections 15148 [Citation] and 15150 [Incorporation by Reference]). By utilizing these provisions of the State CEQA Guidelines, SCWA, in preparing this EIR/EIS, has been able to make maximum feasible and appropriate use of this technical information. An Archaeological and Historical Investigations Report is contained in Appendix G.

3.5.2 Concepts and Terminology for Evaluation of Cultural Resources

The following definitions are common terms used to discuss the regulatory requirements and treatment of cultural resources:

- *Cultural resources* is the term used to describe several different types of properties: prehistoric and historical archaeological sites; architectural properties such as buildings, bridges, and infrastructure; and resources of importance to Native Americans.

- *Historic properties* is a term defined by the National Historic Preservation Act (NHPA) as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such a property.

- *Historical resource* is a California Environmental Quality Act (CEQA) term that includes buildings, sites, structures, objects, or districts, each of which may have historical, prehistoric, architectural, archaeological, cultural, or scientific importance, and is eligible for listing or is listed in the California Register of Historical Resources (CRHR).

- *Paleontological resource* is defined as including fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. A unique paleontological site would include a known area of fossil-bearing rock strata.

3.5.3 Existing Setting

Prehistory

Northern Sonoma County has a long and rich history of occupation and use by Native American groups. The Russian River and the surrounding valleys provided a rich and varied habitat for Native Americans, and initial use of the area dates to at least 6,000 years ago. Most of the archaeological research in the area has been conducted in the Warm Springs Dam area and near Santa Rosa (cf., Baumhoff and Orlins, 1979; Baumhoff, 1980; Basgall, 1982; Basgall and Bouey, 1984, 1988; Wickstrom, 1986; Villenmaire and Huberland, 1986; and Bouey, 1987). Research for the Geyers Project has also provided archaeological data for the area (cf., Gerike et al., 2000). Regardless, this research has provided baseline archaeological information for the area, but there are still significant gaps in archaeological data for the area and our understanding of regional cultural history.

Archaeological research in the project area has a relatively short history, but the archaeology of the area is related to adjacent regions such as the San Francisco Bay Area and the Sacramento/San Joaquin Delta, which have a history of research dating to the early 1900s. Intensive investigation of the San Francisco Bay region dates to the early 1900s, and is highlighted by the work of Max Uhle (1907) and N.C. Nelson (cf., Nelson, 1907, 1909a, 1909b). Uhle began excavations at Emeryville shellmound near Berkeley, which was one of the largest shellmounds in the Bay region, and Nelson was the first archaeologist to recognize the Bay Area as a discrete archaeological area. Nelson documented over 100 shellmounds in the littoral zone along the bayshore, and identified a pattern of intensive use of shellfish during his investigations in the area. Nelson viewed intensive use of shellfish as indicative of a general economic pattern for the region.

Archaeological exploration of the San Francisco Bay region increased after the pioneering work of Uhle and Nelson. Archaeologists from the University of California, Berkeley excavated sites at Ellis Landing, Emeryville, West Berkeley, Stege, Fernandez, Castro, Bayshore, Princeton, Greenbrae, Sausalito, San Rafael, and Point Reyes (Moratto, 1984). These investigations supported Nelson's hypothesis that the San Francisco Bay area was a distinct archaeological region with similar temporal changes in artifact assemblages and other cultural practices evident across the region. Indeed, the region gives the impression that closely related cultures occupied the margins of the San Francisco Bay system for a considerable length of time.

The archaeological work in the San Francisco Bay area generated a significant amount of data, and by the 1940s there was sufficient information for Beardsley (1948, 1954) to expand the Central California Taxonomic System (CCTS), which he developed for the Sacramento/San Joaquin Delta, and correlate archaeological cultures in the Delta with those in the Bay. The CCTS proposed a linear and uniform chronological sequence of cultural succession, and was divided into temporal-cultural units that included: *components,* which represent discrete occupational episodes at a site; *facies*, which represent a series of closely related components; *provinces*, which are composed of related facies; and *horizons*, which are broad cultural units composed of a series of temporally and geographically discrete components. Three horizons, Early, Middle and Late, were identified for the archaeological cultures in central California and the San Francisco Bay region.

The CCTS and other early archaeological research concentrated on material culture (e.g., burial practices) and the development of chronologies based on differences in the composition of assemblages. Issues related to subsistence, settlement strategies, social organization, and trade received minimal or no attention. The CCTS was designed to provide a means of ordering archaeological cultures in central California, but the model, particularly the creation of widespread sequences of cultural succession, was immediately questioned in a series of papers by Gerow (1954, 1974a, 1974b; Gerow and Force, 1968). Gerow suggested that two distinct cultures or traditions existed in Central California and the Bay area during the Early and Middle Horizons, and that these two cultural groups gradually converged.

Frederickson (1973, 1974) also questioned aspects of the CCTS, and proposed a new taxonomic system for central California. Fredrickson (1973) defined a series of patterns (i.e., Post, Borax Lake, Berkeley, and Augustine) for the North Coast Ranges, the San Francisco Bay and the lower Sacramento Valley, and assigned them to six periods: Paleo-Indian (10,000 to 6,000 B.C.); Lower, Middle, and Upper Archaic (6,000 B.C. to A.D. 500); and Upper and Lower Emergent (A.D. 500 to 1800). Periods are temporal units that facilitate the grouping of specific cultures based on an adaptive mode (e.g., economics or social structure) (Fredrickson, 1973:112-113).

The Post Pattern (8,000-12,000 B.P. [Before Present]) represents the earliest occupation of the project area and is characterized by fluted, concave-base projectile points and crescents (Basgall, 1993). There is scant archaeological data regarding the settlement and subsistence strategies associated with the Post Pattern, but it appears that the strategies focused on hunting and gathering (Fredrickson, 1984; Fredrickson and White, 1988).

The Borax Lake Pattern (2,500-8,000 B.P.) highlights a combined generalized hunting and collecting subsistence pattern. The use of heavy, wide-stemmed projectile points and the milling slab and mano are characteristic of this Pattern (Chartkoff and Chartkoff, 1984; Basgall, 1993).

The Berkeley Patten (1,500-2,500 B.P.) highlights the expansion of collecting and the incorporation of other resource acquisition strategies (e.g., fishing and exploitation of other aquatic resources such as shellfish). Artifacts typically associated with this Pattern include: the atlatl; dart-sized, non-stemmed projectile points primarily made from obsidian; mortars and pestles; and bone tools (Frederickson, 1984 and 1994; Basgall, 1993). Flexed burials are also characteristic of the Pattern.

The Augustine Pattern (1,500-200 B.P.) is characterized by a change in technology and subsistence strategies. These changes include: introduction of bow and arrow technology, as evidenced by small projectile points; acorns becoming the staple food resource; and the use of fish harpoons. Pre-interment grave pit burning, flexed burials, and grave goods including shell beads and ornaments are also typical of the Pattern. The Pattern is highlighted by an intensification of trade and an increase in sociopolitical complexity and social stratification. In addition, the Augustine Pattern appears to be associated with Pomo occupation of the area, which is the cultural pattern encountered by Russians, Spanish, and subsequent Euroamericans that entered the area.

Ethnography

Prior to the arrival of Euroamericans in the region, California was inhabited by groups of Native Americans speaking more than 100 different languages and occupying a variety of ecological settings. Kroeber (1925) subdivided California into four subculture areas, Northwestern, Northeastern, Southern, and Central. The NSCARP project area is in the Central area in Southern Pomo and Wappo territory.

Southern Pomo

The traditional territory of the Southern Pomo is in northern Sonoma County, and encompasses the area from approximately five miles south of Santa Rosa north to nearly the current county line and extending from the Russian River toward the west to Gualala and the border with the Kashaya Pomo. The Pomo language appears to be part of the Hokan language family. There are seven Pomo languages that are represented by seven groups in different geographic locations. The seven groups include the Northern, Northeastern, Eastern, Southeastern, Central, Southern, and Kashaya Pomo. Ethnographic sources on Pomo include Kostromitonov (1974), Powers (1877), Barrett (1908), Kroeber (1925), Loeb (1926), Gifford and Kroeber (1939), Kniffen (1939), Stewart (1943), McLendon and Oswalt (1978), Bean and Theodoratus (1978), and McLendon and Lowy (1978).

Pomo culture is quite variable, with many similarities and differences among the speakers of the seven different Pomoan languages. According to Gifford and Kroeber (1939:117) Pomo were

Divided into a number of small groups, which at one time or another have been called tribes, villages, village-communities, or tribelets. Each of these was completely autonomous and owned a tract of land, which might or might not be exactly defined but was substantially recognized by all neighboring communities. According to most informants, nearly every community also spoke a slightly but perceptibly distinct subdialect [dialect of one of the seven languages]. Each normally possessed a main settlement or central village, which in many of the groups appears to have remained fixed for generations.

Pomo social and political organization is quite variable, but Pomo were typically organized into tribelets that were composed of bilaterally related kin groups that ranged in size from 100-2,000 persons (Kunkel 1962). Tribelets generally occupied individual villages and had a chief or headman, but multiple chiefs for a single tribelet were also common. Succession to the position of chief was also variable, but hereditary succession was common (Bean and Theodoratus, 1978). There were several villages/settlements located in the project area, including: Makahmo that was located on the banks of Sulphur Creek near its confluence with the Russian River northeast of Cloverdale; Kachitiyo that was located northwest of Makahmo near the west bank of the Russian River north of Cloverdale; Akamotcolowani, near the west bank of the Russian River southeast of Cloverdale; Kalanko, which may have become the Cloverdale Rancheria; Motitcaton a short distance west of the Russian River southeast of Cloverdale; Amako located on the east bank of the Russian River near Asti; and Kahtahwe that is near Healdsburg.

Shamanism was common among the Pomo. Shamans were professionals who specialized in curing and other ceremonial aspects of Pomo life such as the Kuksu Cult that highlighted curing and group well being (Bean and Theodoratus, 1978). Individuals became shamans either through inheritance or dreams. In addition, the Pomo began practicing the Ghost Dance around 1870 (Bean and Theodoratus, 1978).

Pomo subsistence strategies highlighted the exploitation of a wide variety of plant and animal resources. The acorn served as a staple food supply, but other plant resources were also collected including buckeyes, berries, seeds from grasses, seaweed, and kelp. Pomo engaged in individual and communal hunts to acquire deer, elk, antelope, rabbits, squirrels, and a variety of bird species. Marine and freshwater resources (e.g., fish and clams) were also used for food. Resources were acquired and processed using: bow and arrows; spears; clubs; snares; traps; mortars and pestles; and baskets.

Pomo built three basic types of structures that included dwelling houses, temporary shelters, and semi-subterranean houses (Bean and Theodoratus, 1978). The overall configuration and materials used in the construction of these structures varied among the different Pomo groups. Regardless, dwelling houses were constructed for individual families and semi-subterranean houses were used for different purposes. Small-scale houses were used as sweat lodges and larger scale houses (i.e., 40-60 feet in diameter) were used for ceremonial purposes (Bean and Theodoratus, 1978).

External relations between Pomo and their neighbors included both friendly and hostile relations. Trade was an important activity among Pomo and they had economic relationships with their neighbors, including the Yuki, Cahto, Lake Miwok, Wappo, and Patwin (Bean and Theodoratus, 1978). Southern Pomo were extensive traders and numerous trails have been identified in the area, particularly along the Russian River and other creeks. For example, they would travel to Stewart's Point on the coast two or three times a year for salt and seafood and also obtained clam shells from Bodega Bay and obsidian and magnesite in Lake County. Pomo appear to be central in an economic network that included a large number of Native American groups across northern California. Pomo functioned as middlemen in the trade of food (e.g., fish and salt), manufactured goods (e.g., beads), and raw materials (e.g., shells and obsidian) (Aginsky, 1958). Skilled traders could become wealthy by acquiring large numbers of beads, which were signs of power and status. Regardless of the importance of trade among Pomo, not all their interactions with other groups were friendly. Warfare was precipitated for a number of reasons, but warfare was usually associated with attempts to acquire additional territory or access to raw materials (e.g., obsidian) (Bean and Theodoratus, 1978).

Wappo

Wappo primarily occupy territory in Napa County, but their territory does encompass part of the Alexander Valley north of Healdsburg to Geyserville. Wappo is a dialect of the Yukian language, which also includes Yuki, Coast Yuki, and Huchnom. Wappo is the name given to Wappo-speaking people by the Spanish. Wappo is reported to be derived from the Spanish word guapo, which may be interpreted as brave (Sawyer, 1978). This name apparently originated from Wappo resistance to the incursion of Euroamericans in Napa Valley during the eighteenth and nineteenth centuries (Heizer, 1953). Ethnographic sources on Wappo include Driver (1936) and Sawyer (1978).

The sociopolitical unit of Wappo was the village, which was generally located along a creek or another water source and included either one or two sweathouses, depending on the size of the village (Sawyer, 1978). Kroeber (1925) claims that the population of the Wappo never exceeded 1,000 people, but more recent evidence suggests that it may have been significantly larger (cf., Sawyer, 1978).

Wappo subsistence strategies highlighted the exploitation of a wide variety of plant and animal resources. The acorn served as a staple food supply, but other plant resources were also collected including buckeyes, berries, seeds from grasses, and seaweed (Sawyer, 1978). Wappo hunted deer, elk, antelope, rabbits, squirrels, and a variety of bird species and also acquired a wide range of marine and freshwater resources (e.g., fish, eels, abalone, and clams) (Sawyer, 1978). Resources were acquired and processed using: bow and arrows; spears; clubs; snares; traps; mortars and pestles; and baskets.

External relations between Wappo and their neighbors were generally friendly. Trade, however, does not appear to be a major interest or activity among the Wappo although they did trade obsidian to neighboring groups. On the other hand, travel appears to be part of Wappo culture. Wappo made trips to the coast for resources and visited their neighbors for celebrations.

Euroamerican Contact

The first contact between Pomo and Euroamericans probably occurred in the late 1500s when Sir Francis Drake was exploring the coastline and stopped in Pomo territory to acquire water and other supplies (Bean and Theodoratus, 1978). Euroamerican contact with Native Americans in the general area of San Francisco, however, was very sporadic until 1776. In 1776, the Spanish established the San Francisco presidio and mission, and undoubtedly interacted with groups of Pomo. By 1817, the Spanish established a mission at San Rafael and began recruiting Native Americans as far north as Santa Rosa (Beck and Haase, 1974). Subsequently in 1832, the Mission San Francisco de Solano was established in Sonoma, extending Spanish influence further to the north (Beck and Haase, 1974). The Spanish attempted to convert the Native American population to Catholicism and incorporate them into the "mission system." Mission records suggest that approximately 600 Pomo were baptized at Mission San Francisco de Solano and San Rafael (Bean and Theodoratus, 1978).

The process of missionization disrupted traditional Pomo cultural practices, and they were generally slow to adapt to the mission system. The Spanish, however, were intent on implementing it, and this factor coupled with exposure to European diseases virtually ended the traditional life of Native Americans in northern Sonoma County. During the early 1800s, Russians also began to explore and establish settlements in Pomo territory. For example, a Russian trading expedition entered Bodega Bay in 1809 and in 1811 a Russian settlement was established at Fort Ross (Bean and Theodoratus, 1978). Regardless, the region remained at the fringes of settlement in California. Even after Mexican independence from Spain, in the 1820s, the Mexican government continued to consider the area as the periphery of Mexican territory and left it relatively unsettled. In 1826, Jedediah Strong Smith, an American fur trapper, and a small number of associates made the first overland expedition into California and returned in 1827 to explore the San Joaquin and Sacramento valleys. The Mexican government insisted he and his men leave, but the path into the Sacramento Valley and California, in general, was opened (Hoover, et al., 1990).

Mission records revel that Wappo unsuccessfully battled the Spanish, and Wappo from villages in Sonoma and Napa Counties were brought to the mission at Sonoma between 1823 and 1834 to be used for labor (Milliken, 1995). In 1854, the Wappo of the Russian River Valley were moved to a reservation in Mendocino. By 1856, nearly half the Wappo moved to Mendocino had died (Sawyer, 1978). The reservation was closed in 1867.

History

The Russians first explored Bodega Bay and the surrounding area in 1809. Subsequently, in 1812 the Russians established Fort Ross and managed a network of settlements, farms, and outposts stretching over 55 miles of coastline until the 1840s (Lightfoot, Wake, and Schiff, 1991). Containing the growth of Fort Ross was the primary impetus for the northern expansion of the Spanish mission system and Mexican settlement north of San Francisco. Father José Altamira founded Mission San Francisco Solano in 1823 at Sonoma to establish a Mexican presence on the northern frontier.

The Mexican period (ca. 1821-1848) in California is an outgrowth of the Mexican Revolution, and its accompanying social and political views affected the mission system. In 1833, the missions were secularized and their lands divided among the Californios as land grants called ranchos. These ranchos facilitated the growth of a semi-aristocratic group that controlled the larger ranchos. Owners of ranchos used local populations, including Native Americans, essentially as forced labor to accomplish work on their large tracts of land. Consequently, Pomo, Wappo, and other Native American groups across California, were forced into a marginalized existence as peons or vaqueros on large ranchos. Ranchos in the project area include: Rincon de Musalacon; Caslamayomi; Sotoyome; Tzabaco; Molinos; and San Miguel (Beck and Haase, 1974).

Mariano Guadalupe Vallejo was sent to establish a military presence at Sonoma in 1833. In return for his service, Vallejo received the approximately 66,000-acre Rancho Petaluma land grant, one of the largest in California (Beck and Haase, 1974). In addition, twenty-five more land grants were made in the Sonoma County area during Mexican rule. The Mexican settlement in the area during the 1830s-1840s limited Russian encroachment into Mexican territory. Regardless, other foreigners from the United States and other countries began to encroach into Mexican territory and settle on the Santa Rosa Plain and in Alexander Valley during the 1840s.

In 1846, the United States declared war on Mexico, and American settlers in California feared they might be driven from the region by the Mexican government. Consequently, John C. Fremónt was enlisted to lead a revolt against Mexico. The Bear Flag Revolt, as it came to be known, soon took possession of General Vallejo's stronghold in Sonoma and kept Vallejo prisoner for two months. The Bear Flag Revolt was not authorized by the United States government, so the Bear Flag was raised over Sonoma after its capture (Hoover, et al., 1990).

The end of the Mexican-American War and the signing of the Treaty of Guadalupe Hidalgo in 1848 marked the beginning of the American period (ca. 1848-Present) in California history. The onset of this period, however, did nothing to change the economic condition of the Native American populations working on the ranchos. The rancho system generally remained intact until 1862–1864, when a drought forced many landowners to sell off or subdivide their holdings. At this time, landowners started to fence ranges and the economy began a shift from cattle ranching to dairy farming and agriculture based on fruit and grain crops, and eventually vineyards. Regardless of a change of economic focus, the plight of Native American populations remained, at best, relatively unchanged (e.g., the U.S. Senate rejected treaties between the government and Native Americans in 1851 and 1852, and military reserves were established to maintain various groups) (Heizer, 1974).

The discovery of gold in 1848 at John Sutter's sawmill in Coloma dramatically affected California. It was the catalyst that caused a dramatic alteration of both Native American and Euroamerican cultural patterns in California. Once news of the discovery of gold was spread, a flood of Euroamericans began to enter the region. Immigrants seeking their fortune in the gold fields arrived in California from around the world traveling by ship to San Francisco and by wagon across the Sierra Nevada. Initially, the Euroamerican population in California grew slowly, but soon exploded as the presence of large deposits of gold was confirmed. The population of California quickly swelled from an estimated 4,000 Euroamericans in 1848 to 500,000 in 1850 (Bancroft, 1888). This large influx of immigrants had a negative effect on

Native American cultures, and marks the beginning of a relatively rapid decline of both Native American populations and culture.

Various population estimates attest to the rapid and almost total decline of indigenous people. Diseases introduced by Euroamericans resulted in the annihilation of nearly 75 percent of the native population (Heizer, 1960). The former character and the decline of Native American culture is highlighted by Princess Isidora Solano, wife of Chief Francisco Solano, who dictated her memoirs in 1874 at the age of 90 (Sanchez, 1930). She recounts the exploits of Francisco Solano, chief of the Suisunes, Topaytos, Yoloitos, and Chuructos and an important ally of General M. Guadalupe Vallejo, and describes the abundance of resources (e.g., salmon) in current Napa and Sonoma counties prior to the arrival of “the white man". Princess Isidora also highlights the decline of Native American culture, and frequently refers to her use of liquor, of which she was "not ashamed… because the white men taught it to me" (Sanchez, 1930:52).

The latter half of the nineteenth century witnessed an ongoing and growing immigration of Anglo-Americans into the area, an influx also accompanied by regional cultural and economic changes. Indeed, Anglo-American culture expanded at the expense of Hispanic culture. Dispersed farmsteads slowly replaced the immense Mexican ranchos, and the farming of various crops slowly replaced cattle ranching as the primary economic activity in the region. The advent of the railroad in the area in the late 1800s, and the mechanization of farming with steam-driven machinery, once again altered the economy of the region. For example, larger and larger tracts of land were opened for farming. These agricultural developments demanded a large labor force and sparked a new wave of immigration into the region. These changes are highlighted by the development of towns associated with expanding business opportunities related to either agriculture or logging. Sonoma County held expansive arable land near San Francisco and transportation routes to the gold mining regions in the foothills of the Sierra Nevada. The miners and mining towns in the Sierra Nevada had a seemingly limitless demand for food, which facilitated the agricultural development of Sonoma County. The development of Sonoma County continues to the present with the expansion of agriculture and viticulture.

Sonoma County

Sonoma is one of California’s original counties, and after the gold rush, the population increased dramatically and towns grew rapidly. In 1853, Santa Rosa consisted of only a few buildings, but the following year it became the county seat as a result of a series of political maneuvers by a group of developers and local boosters. By 1860, nearly all of the present–day cities and towns in Sonoma County were either recently formed or thriving communities. For example, Geyserville was first used as a stage stop en route to The Geysers resort in 1851; Sebastopol was founded in 1855; Healdsburg was founded in 1857; and Cloverdale, which was established in 1854 as a trading post, grew quickly after it became a railroad terminus in 1859 (Hansen and Miller, 1962:48). Rail service in the area expanded through the 1870s and provided access to the area from San Francisco.

Cattle ranching originally dominated economic activity in Sonoma County. During the 1860s, a shift occurred from cattle ranching to sheep herding. A primary reason for the shift was the Civil War and a demand for wool for military uniforms. The demand for wool continued, and Sonoma County became one of the country's leading wool producers. In addition, dairy ranching, poultry, and agriculture grew in the County. Indeed, Petaluma became a center for poultry production and crops such as potatoes, grains, wine grapes, hops, apples, plums, and prunes were also grown in the County. Hops were especially well–suited to the alluvial plains and terraces along the Russian River, the Laguna de Santa Rosa, and on the Santa Rosa Plain. The success of hops coincided with a drop in wheat prices, and most grain farmers with the right soils and climate switched to the new crop. By 1890, hops were the leading field crop in the county, and the Santa Rosa area became known as the nation's hop capital (LeBaron et al., 1985).

At the end of the nineteenth and beginning of the twentieth century, viticulture expanded in Sonoma County and became an important part of the agricultural economy of the area. Prohibition, however, resulted in the collapse of the California wine industry. A few viticulturists survived by producing limited amounts of wine for medicinal, sacramental, or cooking purposes. These individuals devised creative ways to continue to produce and sell their wine. For example, winemaking, which was still legal if a family annually produced 200 gallons or fewer, continued in individual households, and local doctors prescribed wine to cure ills. Regardless, Prohibition stifled the wine industry in California and it did not recover until the 1950s. Since that time, the recovery of the regional wine industry has been dramatic, with wine production and tourism steadily increasing in Sonoma County and surrounding regions. The industry would not fully recover until the 1970s, when the reputation of Sonoma County wines began to spread throughout the nation and the world. Today, Sonoma County is known for its vineyards and premier wines.

3.5.4 Known Cultural Resources in the Project Area

Archaeological and historical investigations for the NSCARP identified forty previously recorded prehistoric and historic sites and a new historic site within or adjacent to the entire project APE (see Table 3.5-1). Prehistoric sites CA-Son-622 and CA-Son-1929, which are lithic scatters, are located within the project APE. Historic site CA-Son-2317H, which is the historic and current alignment of Alexander Valley Road, the J Wine Trash Dump, and historic site P-49-2283, the Slusser Trash Dump, are located in the project APE. In addition, five bridges, 20C-0006, 20C-0106, 20C-0155, 20C-0155, and 20-0038, are located in the project APE. Bridge 20C-155, Wohler Bridge, is eligible for inclusion in the National Register of Historic Places.

There are eight historic sites in the Alexander Valley-Jordan Reservoir Subset. Historic site CA-Son-2317H and the Jimtown Bridge, 20C-0006, are located within the APE for this subset.

There is one prehistoric and one historic site in the Russian River Valley-Westside Subset. Prehistoric site CA-Son-1929 and historic site P-49-3223 are located within the APE for this subset.

3.5.5 Paleontological Resources

Paleontology is defined as a science dealing with the life of past geological periods as known from fossil remains. Paleontological resources include fossil remains, as well as fossil localities and formations, which have produced fossil material in other nearby areas. CEQA offers protection for these sensitive resources and requires that they be addressed during the EIR process.

A search of the University of California Museum of Paleontology (UCMP) collections database identified that paleontological resources have been discovered in Sonoma County.

Paleontological resources within the County have been primarily recovered from the following geologic formations:

- Franciscan Formation, which covers the northern part of the County with the exception of the Alexander Valley and the northern Santa Rosa Plain;
- Wilson Grove, Ohlson Ranch, and Petaluma Formations, which occur in the western part of the County and the base of the Sonoma Mountains; and
- Sonoma Volcanics, which occur in the Sonoma and Napa mountains.

Table 3.5-1 Known Cultural Resources in the Planning Area

Site Identification Number	Description
CA-Son-621	Lithic scatter
CA-Son-622	Lithic scatter
CA-Son-623	Lithic scatter
CA-Son-624	Adobe homestead
CA-Son-626	Lithic scatter
CA-Son-630	Lithic scatter
CA-Son-631	Lithic scatter
CA-Son-632	Lithic scatter
CA-Son-1237H	Historic buildings
CA-Son-1789	Lithic scatter
CA-Son-1820/H	Lithic scatter; historic buildings
CA-Son-1929	Lithic scatter
CA-Son-1988H	Historic buildings
CA-Son-2116	Prehistoric house pit
CA-Son-2317H	Historic road alignment; Jimtown Bridge, 20C-0006
P-49-2283	Historic trash scatter
P-49-2686	Historic buildings
P-49-2688	Historic trash scatter
P-49-2689	Historic trash scatter
P-49-2690	Historic ranch complex
P-49-2694	Historic building foundations
P-49-2697	Historic building foundations

Table 3.5-1 (Continued)

Site Identification Number	Description
P-49-2698	Historic building foundations
P-49-2700	Historic palm trees
P-49-2866	Wohler Bridge, 20C-0155
P-49-2870	Lambert Bridge, 20C-0248
P-49-2894	Historic building
P-49-2895	Historic building
P-49-3058	Historic farm complex
P-49-3223	Historic ranch complex
Son-HR-33	Historic building
Son-HR-34	Historic building
C-265	Historic building
C-912	Historic building
C-1081	Historic building
20C-106	Yoakim Bridge, 20C-0106
20-0038	Bridge
J Wine Trash Dump	Historic trash scatter

3.5.6 Regulatory Framework

Federal

The Code of Federal Regulations (CFR) Title 36 Part 60.4 [a-d] presents criteria for determining the significance and eligibility of prehistoric and historic sites for inclusion in the National Register of Historic Places (NRHP). The United States Department of the Interior, Bureau of Reclamation NEPA Handbook (2000) at Chapter 3.13.4 also cites this CFR regarding the identification and protection of cultural resources. The significance and eligibility for inclusion in the NRHP of the sites located within project boundaries will be considered following those criteria and in relation to appropriate historic themes. The criteria at 36 CFR Part 60.4 [a-d] includes the following:

- The quality of significance in American history, architecture, archaeology, culture, and engineering is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- That are associated with events that have made a significant contribution to the broad patterns of our history; or

- That are associated with the lives of persons significant in our past; or

- That embody the distinct characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

- That have yielded, or may be likely to yield, information important in prehistory or history.

State

California Environmental Quality Act

Under CEQA, public agencies must consider the effects of their actions on both “historical resources” and “unique archaeological resources.” Pursuant to California Public Resources Code Section 21084.1, a “project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.” Section 21083.2 requires agencies to determine whether proposed projects would have effects on “unique archaeological resources.”

“Historical resource” is a term with a defined statutory meaning (Public Resources Code, Section 21084.1 and State CEQA Guidelines, Section 15064.5 [a], [b]). The term embraces any resource listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR). The CRHR includes resources listed in or formally determined eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest.

Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be “historical resources” for purposes of CEQA unless a preponderance of evidence indicates otherwise (Pub. Resources Code, Section 5024.1 and California Code of Regulations, Title 14, Section 4850). Unless a resource listed in a survey has been demolished, lost substantial integrity, or there is a preponderance of evidence indicating that it is otherwise not eligible for listing, a lead agency should consider the resource to be potentially eligible for the CRHR.

In addition to assessing whether historical resources potentially impacted by a proposed project are listed or have been identified in a survey process (Public Resources Code 5024.1 [g]), lead agencies have a responsibility to evaluate them against the CRHR criteria prior to making a finding as to a proposed project’s impacts to historical resources (Public Resources Code, Section 21084.1 and State CEQA Guidelines, Section 15064.5 [a][3]). Following CEQA Guidelines Section 21084.5 (a) and (b) an historical resource is defined as any object, building, structure, site, area, place, record, or manuscript that:

- Is historically or archeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political or cultural annals of California; and

- Meets any of the following criteria:
  - Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
  - Is associated with the lives of persons important in our past;
  - Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
  - Has yielded, or may be likely to yield, information important in prehistory or history.

Archaeological resources may also qualify as "historical resources". California Public Resources Code 5024 requires consultation with the Office of Historic Preservation when a project may impact historical resources owned by the State.

State CEQA Guidelines Section 15064.5, subdivision (b)(3) and Section 15126.4 subdivision (b) provide mitigation measures related to impacts on historical resources. Following these mitigation measures, including preservation in place, data recovery through excavation, and the United States Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (1995), a project's impact on any historical resources shall generally be considered mitigated to a level of less than significant. Potential eligibility also rests upon the integrity of the resource. Integrity, following 14 California Code of Regulations Section 4852(c), is defined as the retention of the resource's physical identity that existed during its period of significance. Integrity is determined through considering the setting, design, workmanship, materials, location, feeling, and association of the resource.

As noted above, CEQA also requires lead agencies to consider whether proposed projects will impact "unique archaeological resources." Public Resources Code Section 21083.2, subdivision (g), states that "'unique archaeological resource' means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

- Has a special and particular quality such as being the oldest of its type or the best available example of its type.

- Is directly associated with a scientifically recognized important prehistoric or historic event or person."

Treatment options under Public Resources Code Section 21083.2 include activities that preserve such resources in place in an undisturbed state. Other acceptable methods of mitigation under Section 21083.2 include excavation and curation or study in place without excavation and curation (if the study finds that the artifacts would not meet one or more of the criteria for defining a "unique archaeological resource").

Advice on procedures to identify cultural resources, evaluate their importance and estimate potential effects, and consult with Native Americans is given in several agency publications such as the Technical Assistance Series produced by the Office of Historic Preservation (OHP) and the Tribal Consultation Guidelines produce by the Office of Planning and Research (OPR). The technical assistance series and the consultation guidelines strongly recommend that Native American concerns and the concerns of other interested persons and corporate entities, including but not limited to, museums, historical commissions, associations and societies, be solicited as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains, and associated grave goods regardless of their antiquity and provides for the sensitive treatment and disposition of those remains (Section 7050.5 of the Health and Safety Code and Public Resources Code 5097.9).

When human remains are discovered, the protocol to be followed is specified in California Health and Safety Code, which states:

> *In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.*

State CEQA Guidelines Section 15064.5, subdivision (e), requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the Native American Heritage Commission (NAHC) must be contacted within 24 hours. At that time, the lead agency must consult with the appropriate Native Americans, if any, as timely identified by the NAHC. Section 15064.5 directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

In addition to the mitigation provisions pertaining to accidental discovery of human remains, the State CEQA Guidelines also require that a lead agency make provisions for the accidental discovery of historical or archaeological resources, generally. Pursuant to Section 15064.5, subdivision (f), these provisions should include “an immediate evaluation of the find by a qualified archaeologist. If the find is determined to be an historical or unique archaeological resource, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or appropriate mitigation should be available. Work could continue on other parts of the building site while historical or unique archaeological resource mitigation takes place.”

Senate Bill 18 (Cal. Gov. Code Sections 65352.3, 65352.4) requires that, prior to the adoption or amendment of a general plan, adoption of a specific plan, or designation of open space proposed on or after March 1, 2005, a city or county must consult with Native American tribes with respect to the possible preservation of, or the mitigation of impacts to, specified Native American places, features, and objects located within that jurisdiction. Senate Bill 18 does not apply to the proposed project. Regardless, the Native American community has been consulted regarding the project.

Paleontological resources are classified as non-renewable scientific resources and are protected by state statute (e.g., Public Resources Code Section 5097.5 (a), Removal or Destruction; Prohibition), and Appendix G to the CEQA Guidelines. No state or local agencies have specific jurisdiction over paleontological resources. No state or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earth moving on state or private land in a project site.

Local

Sonoma County General Plan

The existing Sonoma County General Plan was adopted in 1989 and is currently undergoing update. The NSCARP is subject to the County General Plan (Open Space Element). Sonoma County General Plan Goal OS-9 and its associated objectives (i.e., OS-9-1, OS-9-2, and OS-9-3) and policies (i.e., OS-9a, OS-9e, and OS-9f) for archaeological/historical resources are applicable to the NSCARP.

General Plan Objectives OS-9-1, OS-9-2, and OS-9-3 address the identification and protection of archaeological and historical sites and buildings. These policies include: conducting archaeological and historical studies to identify cultural resources; determining the eligibility for inclusion in the California Register of Historical Resources of cultural resources; and implementing mitigation measures for the protection of cultural resources. Refer to Section 3.9, Table 3.9.3 for a list of applicable goals, objectives, and policies of the Sonoma County General Plan regarding cultural resources.

Sonoma County Zoning

The County regulates historic resources through the use of the Historic Combining District (HD). The HD zoning requires that any exterior alteration, repair, or addition to the structure on a site zoned HD, which may require a building permit, is subject to review and approval by the Landmarks Commission. New building construction and a demolition permit in areas zoned HD is also subject to review of the Landmarks Commission. In addition, record searches at the Northwest Information Center at Sonoma State University, Rohnert Park, to identify archaeological resources, field surveys, and mitigation measures, if archaeological resources are identified, may also be requires by the Landmarks Commission prior to approval of projects in HD zoned areas.

Landmarks Commission

The Landmarks Commission was established by the Sonoma County Board of Supervisors in 1976 for the purpose of protecting historic resources and implementing a grants program for historic preservation projects. The Landmarks Commission functions as design review and for demolition review for properties in HD zoned areas. The Landmarks Commission also maintains a list of historic sites in Sonoma County and funds the restoration of landmarks.

3.5.7 Methodology

Archaeological and historical investigations for the NSCARP included: a records search conducted at the Northwest Information Center, Sonoma State University, Rohnert Park to identify previous surveys and previously recorded cultural resources in the project area; archival research; a sacred lands search conducted by the Native American Heritage Commission; consultation with the Native American community; and pedestrian surface survey of the proposed pipeline alignments, pumping stations, and reservoir sites. Impacts to cultural resources (e.g., prehistoric sites, historic sites, historic buildings/structures, and isolated artifacts) were evaluated based on the results of these investigations. All alternatives are considered at an equal level of analysis.

Paleontological investigations included a search of the University of California Museum of Paleontology collections database. This search did not identify any paleontological resources in the project Area of Potential Effect (APE), but did identify that paleontological resources have been discovered in other areas of Sonoma County.

The NSCARP is not subject to Senate Bill 18. Regardless, Sonoma County understands the importance of contacting local Tribes and values their participation in the planning process. A sacred lands search and a list of Native American contacts was requested from the NAHC for the project. The sacred lands search did not identify any Native American cultural resources either within or near the project area. All Native American groups and/or individuals identified by the NAHC were contacted by letter regarding the NSCARP.

3.5.8 CEQA Thresholds of Significance Criteria

Following 36 CFR 800.16 (i) defines effect as

- Alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Places

- Following Public Resources Code Sections 21083.2 and 21084.1, and Section 15064.5 and Appendix G of the State CEQA Guidelines, Sonoma County considers cultural resource impacts to be significant if a project would:

  - Cause a substantial adverse change in the significance of an archaeological resource or an historical resource as defined in Public Resources Code section 21083.2 and CEQA Guidelines section 15064.5, respectively;

  - Directly or indirectly destroy a unique paleontological resource or site or unique geological feature; or

  - Disturb any human remains, including those interred outside of formal cemeteries.

State CEQA Guidelines Section 15064.5 defines “substantial adverse change” as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource is materially impaired.

3.5.9 Alternatives Analysis

Alternative 1 – No Project

No cultural resources will be affected if the project is not implemented.

Alternative 2 – Entire North Sonoma County Agricultural Reuse Project

Known Prehistoric and Historic Resources

Impact CUL-1. Implementation of Alternative 2 of the NSCARP could result in the potential disturbance of known prehistoric and historic sites.

> **Discussion:** Implementation of Alternative 2 of the NSCARP could impact: prehistoric sites CA-Son-622 and CA-Son-1929; historic sites CA-2317H and P-49-2283; the J Wine Trash Dump; and bridges, 20C-0006, 20C-0106, 20C-0155, 20C-0155, and 20C-0038.
>
> **Impact Category:** Significant but Mitigable
>
> **CEQA Threshold of Significance Criterion:** 1
>
> **Mitigation Measure CUL-1:**

A. Where feasible, the SCWA shall avoid prehistoric and historic sites. If the SCWA cannot avoid the site and impacts may occur, then SCWA shall implement Mitigation Measures CUL-1(B);

B. Update the records for prehistoric sites CA-Son-622 and CA-Son-1929, including determining the boundaries of the sites. If site boundaries are found to extend into the project APE, the eligibility of the sites for inclusion in the NRHP and the CRHR shall be determined by an archaeologist meeting the Secretary of Interior’s Professional Qualifications Standards in prehistoric archaeology. If a site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery shall be implemented for the area of the site within the project APE.

   The eligibility of historic sites CA-2317H, P-49-2283, the J Wine Trash Dump, and bridges, 20C-0006, 20C-0106, and 20-0038 for inclusion in the NRHP and the CRHR shall be determined by an archaeologist and/or historian meeting the Secretary of Interior’s Professional Qualifications Standards in historical archaeology and/or architectural history. If a site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery and/or other appropriate documentation (e.g., Historic American Building Survey reports and/or photographs) shall be implemented for a site or the area of a site within the project APE. In addition, project plans shall include design features, as feasible, for pipeline installation on any bridges that are determined eligible for inclusion in the NRHP or CRHR.

Bridge 20C-0155, Wohler Bridge, is eligible for inclusion in the NRHP and the CRHR. If project plans require that pipeline be attached to the bridge, an architectural historian that meets the Secretary of Interior's Professional Qualifications Standards in architectural history shall prepare appropriate documentation (e.g., Historic American Building Survey reports and/or photographs) for the bridge. In addition, project plans shall include designs features, as feasible, for pipeline installation on the bridge.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure CUL-1 would reduce impacts to prehistoric sites CA-Son-622 and CA-Son-1929, historic site CA-2317H, historic site P-49-2283, the J Wine Trash Dump, and bridges, 20C-0006, 20C-0106, 20C-0155, 20C-0155, and 20-0038 to a less than significant level.

Undiscovered Prehistoric Resources, Historic Resources, and Human Remains

Impact CUL-2. Implementation of Alternative 2 of the NSCARP could result in the potential disturbance of undiscovered prehistoric sites, historical sites, and isolated prehistoric and/or historic features or artifacts, and human remains.

Discussion: Archaeological and historical investigations for the proposed project are adequate to identify typical prehistoric and historic resources in the project site. However, there is a possibility of unanticipated and accidental archaeological discoveries during ground-disturbing project-related activities. Unanticipated and accidental archaeological discoveries during project implementation may have the potential to affect significant archaeological resources and human remains.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criteria: 1 and 3

Mitigation Measure CUL-2:

A. Project contractors and their staff shall be informed of the potential to encounter cultural resources during project implementation and protocols to follow if cultural resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanisms (e.g., handouts). Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during installation of pipelines and construction of reservoirs, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with an appropriate specialist (e.g., archaeologist or architectural historian).

SCWA shall consider mitigation recommendations presented by a qualified archeologist for any unanticipated discoveries. SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.

B. Project contractors and their staff shall be informed of the potential to encounter human remains during project implementation and protocols to follow if human remains are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). If human remains are discovered, all work shall be suspended in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measures CUL-2(A) and CUL-2(B) would reduce impacts to undiscovered cultural resources to a less than significant level.

Paleontological Resources

Impact CUL-3. Implementation of Alternative 2 of the NSCARP could result in the potential disturbance or destruction of undiscovered paleontological resources.

Discussion: A search of the University of California, Berkeley Museum of Paleontology Collections Database and pedestrian surface survey did not identify any evidence of paleontological resources in the project APE. However, there is a possibility of unanticipated and accidental paleontological discoveries during ground-disturbing project-related activities. Unanticipated and accidental paleontological discoveries during project implementation have the potential to affect significant paleontological resources.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 2

Mitigation Measure CUL-3: Project contractors and their staff shall be informed of the potential to encounter paleontological resources during project implementation and protocols to follow if paleontological resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). Should any potentially unique paleontological resources (fossils) be encountered during project activities, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, the SCWA will coordinate any necessary investigation of the discovery with a qualified paleontologist.

SCWA shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. The SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure CUL-3 would reduce impacts on paleontological resources to a less than significant level.

Alternative 3 – Alexander Valley-Jordan Reservoir Subset

Known Prehistoric and Historic Resources

Impact CUL-4. Implementation of Alternative 3 of the NSCARP could result in the potential disturbance of known historic sites.

Discussion: Implementation of Alternative 3 of the NSCARP could impact historic site CA-2317H and the Jimtown Bridge, 20C-0006.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 1

Mitigation Measure CUL-4: The eligibility of historic site CA-2317H and the Jimtown Bridge, 20C-0006 for inclusion in the NRHP and the CRHR shall be determined by an archaeologist and/or historian meeting the Secretary of Interior's Professional Qualifications Standards in historical archaeology and/or architectural history. If a site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery and/or other appropriate documentation (e.g., Historic American Building Survey reports and/or photographs) shall be implemented for a site or the area of a site within the project APE. In addition, project plans shall include design features, as feasible, for pipeline installation on any bridges that are determined eligible for inclusion in the NRHP or CRHR.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure CUL-4 would reduce impacts to historic site CA-2317H and the Jimtown Bridge, 20C-0006, to a less than significant level.

Undiscovered Prehistoric Resources, Historic Resources, and Human Remains

Impact CUL-5. Implementation of Alternative 3 of the NSCARP could result in the potential disturbance of undiscovered prehistoric sites, historical sites, and isolated prehistoric and/or historic features or artifacts, and human remains.

Discussion: Archaeological and historical investigations for the proposed project are adequate to identify typical prehistoric and historic resources in the project site. However, there is a possibility of unanticipated and accidental archaeological discoveries during ground-disturbing project-related activities. Unanticipated and accidental archaeological discoveries during project implementation may have the potential to affect significant archaeological resources and human remains.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criteria: 1 and 3

Mitigation Measure CUL-5:

A. Project contractors and their staff shall be informed of the potential to encounter cultural resources during project implementation and protocols to follow if cultural resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanisms (e.g., handouts). Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during installation of pipelines and construction of reservoirs, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, the SCWA will coordinate any necessary investigation of the discovery with an appropriate specialist (e.g., archaeologist or architectural historian). SCWA shall implement any mitigation necessary for the protection of cultural resources.

   SCWA shall consider mitigation recommendations presented by a qualified archeologist for any unanticipated discoveries. SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.

B. Project contractors and their staff shall be informed of the potential to encounter human remains during project implementation and protocols to follow if human remains are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). If human remains are discovered, all work shall be suspended in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure CUL-5 would reduce impacts to undiscovered cultural resources to a less than significant level.

Paleontological Resources

Impact CUL-6. Implementation of Alternative 3 of the NSCARP could result in the potential disturbance or destruction of undiscovered paleontological resources.

Discussion: A search of the University of California, Berkeley Museum of Paleontology Collections Database and pedestrian surface survey did not identify any evidence of paleontological resources in the project APE. However, there is a possibility of unanticipated and accidental paleontological discoveries during ground-disturbing project-related activities. Unanticipated and accidental paleontological discoveries during project implementation have the potential to affect significant paleontological resources.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 2

Mitigation Measure CUL-6: Project contractors and their staff shall be informed of the potential to encounter paleontological resources during project implementation and protocols to follow if paleontological resources are uncovered. This information may be presented to contractors and their staff through the use of “tail-gate” meetings or other mechanism (e.g., handouts). Should any potentially unique paleontological resources (fossils) be encountered during project activities, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with a qualified paleontologist. SCWA shall implement any mitigation necessary for the protection of paleontological resources.

SCWA shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure CUL-6 would reduce impacts on paleontological resources to a less than significant level.

Alternative 4 – Russian River Valley-Westside Subset

Known Prehistoric and Historic Resources

Impact CUL-7. Implementation of Alternative 4 of the NSCARP could result in the potential disturbance of a known prehistoric site.

Discussion: Implementation of Alternative 4 of the NSCARP could impact prehistoric site CA-Son-1929.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 1

Mitigation Measure CUL-7: Update the record for prehistoric site CA-Son-1929, including determining the boundaries of the sites. If site boundaries are found to extend into the project APE the eligibility of the sites for inclusion in the NRHP and the CRHR shall be determined by an archaeologist meeting the Secretary of Interior’s Professional Qualifications Standards in prehistoric archaeology. If the site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery shall be implemented for the area of the site within the project APE.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure CUL-7 would reduce impacts to prehistoric site CA-Son-1929 to a less than significant level.

Undiscovered Prehistoric Resources, Historic Resources, and Human Remains

Impact CUL-8. Implementation of Alternative 4 of the NSCARP could result in the potential disturbance of undiscovered prehistoric sites, historical sites, and isolated prehistoric and/or historic features or artifacts, and human remains

Discussion: Archaeological and historical investigations for the proposed project are adequate to identify typical prehistoric and historic resources in the project site. However, there is a possibility of unanticipated and accidental archaeological discoveries during ground-disturbing project-related activities. Unanticipated and accidental archaeological discoveries during project implementation may have the potential to affect significant archaeological resources and human remains.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criteria: 1 and 3

Mitigation Measure CUL-8:

A. Project contractors and their staff shall be informed of the potential to encounter cultural resources during project implementation and protocols to follow if cultural resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanisms (e.g., handouts). Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during installation of pipelines and construction of reservoirs, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with an appropriate specialist (e.g., archaeologist or architectural historian). SCWA shall implement any mitigation necessary for the protection of cultural resources.

   SCWA shall consider mitigation recommendations presented by a qualified archeologist for any unanticipated discoveries. The County shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.

B. Project contractors and their staff shall be informed of the potential to encounter human remains during project implementation and protocols to follow if human remains are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). If human remains are discovered, all work shall be suspended in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.

Impact After Mitigation: Less than Significant. Implementation of Mitigation Measures CUL-8 would reduce impacts to undiscovered cultural resources to a less than significant level.

Paleontological Resources

Impact CUL-9. Implementation of Alternative 4 of the NSCARP could result in the potential disturbance or destruction of undiscovered paleontological resources

Discussion: A search of the University of California, Berkeley Museum of Paleontology Collections Database and pedestrian surface survey did not identify any evidence of paleontological resources in the project APE. However, there is a possibility of unanticipated and accidental paleontological discoveries during ground-disturbing project-related activities. Unanticipated and accidental paleontological discoveries during project implementation have the potential to affect significant paleontological resources.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criteria: 2

Mitigation Measure CUL-9: Project contractors and their staff shall be informed of the potential to encounter paleontological resources during project implementation and protocols to follow if paleontological resources are uncovered. This information may be presented to contractors and their staff through the use of “tail-gate” meetings or other mechanism (e.g., handouts). Should any potentially unique paleontological resources (fossils) be encountered during project activities, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with a qualified paleontologist. SCWA shall implement any mitigation necessary for the protection of paleontological resources.

SCWA shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. The County shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure CUL-9 would reduce impacts on paleontological resources to a less than significant level.

3.6 ENVIRONMENTAL JUSTICE

Environmental justice is the consideration of disproportional effects to low-income or minority populations. According to California law, environmental justice is the "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws and policies" (Government Code Section 65040.12(c)). Many state and local government agencies have additional environmental justice responsibilities under Title VI of the Civil Rights Act (42 U.S.C. Section 2000d). Title VI requires recipients of federal funds to conduct their activities and/or programs in a nondiscriminatory manner. In addition, Executive Order 12898, Federal Actions to Address Environmental Justice on Minority Populations and Low-Income Populations, signed by the President Clinton on February 11, 1994, directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. As such, this section analyzes the NSCARP's potential to affect minority populations and low-income communities disproportionately, thus creating an adverse environmental justice impact.

3.6.1 Physical Setting

This section provides a discussion of general population, housing, and income within the County to provide a context for the assessment of potential environmental justice impacts.

Population and Housing

Sonoma County has a total population of approximately 458,000 (U.S. Census Bureau, 2000). Table 3.6-1 provides a listing of the population breakdown by race/ethnicity within Sonoma County and the project area[1]. As shown in Table 3.6-1, the majority of households and individual residents within the project area are white (80.5 percent), with minority groups that identify with some other race, and minority groups that identify with two or more races having populations of 12.1 and 3.8 percent of individuals, respectively.

Income

Table 3.6-2 displays the median household income by age for both the Sonoma County and the State of California (U.S. Census Bureau, 2004). Those between the ages of 45 and 64 years have the highest median income, and those 65 years and older have the lowest median income. The median income for the entire population of Sonoma County is $62,206. This is 22 percent higher than the State of California's median household income. It was estimated that in 2004, approximately 4.7 percent of families within Sonoma County had household incomes below the poverty level, while approximately 10.6 percent of families living in California were below the U.S. Census poverty level (U.S. Census Bureau, 2004).

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[1] Note that the census data referenced for the project area in **Tables 3.6-1** and **3.6-3** includes data for 15 block groups that encompass a much larger area than the Proposed Project area. Block group data referenced below include the following: Census Tract 1529.01, Block Group 2; Census Tract 1537.05, Block Groups 1 and 2; Census Tract 1538.01, Block Groups 1 and 4; Census Tract 1539.01, Block Group 1; Census Tract 1540, Block Groups 1, 2, and 3; Census Tract 1541, Block Groups 1, 2, 3, and 4; Census Tract 1542, Block Groups 1 and 5.

Table 3.6-1. Population and Percent of Total by Race for Sonoma County and the Project Area

Population and Percent of Total by Race for Sonoma County									
Sonoma County	Race								Hispanic or Latino (of any race)
	One Race							Two or More Races	
	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Total		
	374,209	6,522	5,389	14,098	934	38,717	458,614	18,745	79,571
	81.6%	1.4%	1.2%	3.1%	0.2%	8.4%	X	4.1%	17.3%
Population and Percent of Total by Race for Project Area									
Project Area	Race								Hispanic or Latino (of any race)
	One Race							Two or More Races	
	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Total		
	16,000	94	347	229	62	2,399	19,878	747	4,648
	80.5%	0.5%	1.7%	1.1%	0.3%	12.1%	X	3.8%	23.4%

Source: U.S. Census Bureau, 2000.

Within the project area[1], approximately 3.8 percent of families had household incomes below poverty level in 2004. Table 3.6-3 compares families living below the poverty level in California, Sonoma County, and the project area. The U.S. Census poverty level varies dependent upon household size and is measured differently than poverty levels established by the U.S. Department of Health and Human Services.

Table 3.6-2. Median Household Income by Age

Median Household Income	Median Household Income for Sonoma County	Median Household Income for California
Median Household Income	$62,206	$51,185
Householder under 25	$38,853	$29,464
Householder 25-44	$70,711	$54,446
Householder 45-64	$77,627	$63,531
Householder 65 and older	$30,346	$32,120

Source: U.S. Census Bureau, 2004

Table 3.6-3. Families in California, Sonoma County, and the Project Area Living Below the Poverty Level

Region/Location	Percentage of Families Living Below the Poverty Level (Number of Families)
California	10.2%
Sonoma County	4.7% (5,340)
Census Tract 1529.01, Block Group 2	0% (516)
Census Tract 1537.05, Block Group 1	4.0% (150)
Census Tract 1537.05, Block Group 2	0% (232)
Census Tract 1538.01, Block Group 1	5.0% (258)
Census Tract 1538.01, Block Group 4	9.7% (237)
Census Tract 1539.01, Block Group 1	1.7% (300)
Census Tract 1540, Block Group 1	2.1% (188)
Census Tract 1540, Block Group 2	3.8% (184)
Census Tract 1540, Block Group 3	8.0% (424)
Census Tract 1541, Block Group 1	5.8% (171)
Census Tract 1541, Block Group 2	3.8% (447)
Census Tract 1541, Block Group 3	2.7% (291)
Census Tract 1541, Block Group 4	7.7% (220)
Census Tract 1542, Block Group 1	4.2% (711)
Census Tract 1542, Block Group 5	5.6% (501)

Source: U.S. Census Bureau, 2004.

Community Outreach Process

During the project development process, a series of meetings were held to solicit community input concerning the project. In 1997, SCWA conducted a Recycled Water Workshop to evaluate the feasibility of a Sonoma County Recycled Water Distribution System. Conceptual layouts of pipeline routes and storage reservoir sites were presented as well as the benefits of expanded use of recycled water in Sonoma County. The workshop identified several north Sonoma County areas, including the Alexander Valley, Russian River Valley, and Dry Creek Valley areas as potential recipients of recycled water for agricultural use.

The SCWA held three informational pre-scoping meetings for early public input and outreach outside the official CEQA/NEPA process. The meetings were held: (1) February 3, 2004 at Alexander Community Hall; (2) February 4, 2004 at Warm Springs Dam Visitor Center; and, (3) February 5, 2004 at Westside School.

A Notice of Preparation (NOP) was filed with the State Clearinghouse (SCH# 2006012130) on January 27, 2006 for NSCARP pursuant to CEQA. In addition, the NOP was filed with the Sonoma County Clerk's Office, federal agencies, state agencies, local agencies, and interested persons. Appendix A contains a copy of the transmittal report from the State Clearinghouse, a copy of the NOP with a date-received stamped by the County Clerk's Office, and the NOP distribution lists. SCWA published a public notice (see Appendix A) of the availability of the NOP and of the Scoping Meeting (see Section 1.2) as follows:

- Press Democrat – February 11, 12, and 13, 2006
- Healdsburg Tribune – February 9 and February 16, 2006.
- Windsor Times – February 16, 2006.
- SCWA's website.

Reclamation filed a Notice of Intent (NOI) with the Federal Register on January 31, 2006 (see Appendix A) pursuant to NEPA. Reclamation also published a notice of the Scoping Meeting on January 31, 2006 (see Appendix A)

SCWA held a CEQA Scoping Meeting at the Alexander Valley Community Hall on Thursday, February 16, 2006. The meeting was held to provide an overview of the proposed project and solicit input from interested individuals concerning the scope of the environmental analyses as outlined in the project NOP. The Scoping Meeting used an Open House format where SCWA staff were available to answer questions and provide information about NSCARP. Thirty-nine members of the public signed the sign-in sheet (see Appendix B). Following the open house, SCWA staff gave an overview presentation and summarized the environmental review process, including a discussion of the EIR/EIS being prepared for NSCARP, and the distribution of the NOP and NOI. Included in Appendix B is a copy of the transcripts for the two presentations, as well as questions and comments from the public.

The NOP review period concluded on March 15, 2006 (See Appendix C).

3.6.2 Regulatory Setting

Federal

On February 11, 1994, President Clinton issued an "Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" designed to focus attention on environmental and human health conditions in areas of high minority populations and low-income communities, and promote non-discrimination in programs and projects substantially affecting human health and the environment (White House 1994). The order requires the U.S. Environmental Protection Agency (EPA) and all other federal agencies (as well as State agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

In 1997, the USEPA's Office of Environmental Justice released the Environmental Justice Implementation Plan, supplementing the USEPA environmental justice strategy and providing a framework for developing specific plans and guidance for implementing Executive Order 12898.

Federal agencies received a framework for the assessment of environmental justice in the USEPA's Guidance for Incorporating Environmental Justice Concerns in USEPA's NEPA Compliance Analysis in 1998. This approach emphasizes the importance of selecting an analytical process appropriate to the unique circumstances of the potentially affected community. Minority populations, as defined in the guidance document, are identified where either:

- The minority population of the affected area is greater than 50% of the affected area's general population; or
- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Consistent with the definition of minority populations, many environmental justice analyses in CEQA/NEPA documents apply the 50 percent threshold to the identification of low-income populations as well. Specifically, low-income populations are identified where either:

- The low-income population of the affected area is greater than 50 percent of the affected area's general population; or
- The low-income population percentage of the area is meaningfully greater than the low-income population percentage in the general population or other appropriate unit of geographic analysis.

State

While many State agencies have utilized the USEPA's Environmental Justice Implementation Plan as a basis for the development of their own environmental justice strategies and policies, the majority of California State agencies do not have guidance for incorporation of environmental justice impact assessment into CEQA analysis. However, the State of California has a number of legislative actions associated with environmental justice. Most appropriately, under Assembly Bill 1553 (signed in 2001), the Governor's Office of Planning and Research (OPR) is required to adopt guidelines for addressing environmental justice issues in local agencies' general plans. In addition, legislation establishing OPR as the "coordinating agency in state government for environmental justice programs" (California Government Code §65040.12) directs OPR to coordinate its efforts and share information regarding environmental justice programs with federal agencies, and to review and evaluate any information from federal agencies that is obtained as a result of their respective regulatory activities. To this end, Environmental Justice in California State Government (October 2003) is a policy report prepared by OPR intended to provide a brief history of environmental justice, report on the status of OPR's efforts, and provide an outline of environmental justice findings, goals, and policies for future environmental justice efforts within State government.

Although the OPR policy report, the California State Lands Commission (CSLC) Environmental Justice Policy, and State legislation provide useful background information and guidance on equitable treatment of environmental justice populations, no specific guidelines have been adopted at the State level to guide environmental justice analysis in CEQA environmental analysis documents. As such, State agencies have been using federal guidance to assess the environmental justice impacts of the projects under their review. Currently, the OPR is in the process of updating the General Plan Guidelines to incorporate the requirements of AB 1553.

3.6.3 Methodology

For the NSCARP alternatives, an analysis was performed to determine whether any of the adverse effects associated with the federal actions would disproportionately affect low-income or minority populations.

Environmental justice impacts would occur if a project-specific impact would have a disproportional effect on low-income or minority population. As such, to determine potential environmental justice impacts, the potential adverse impacts identified in the other resource sections have been considered for their potential to have a disproportional effect on low-income or minority populations.

The definitions of minority and low-income populations used for the environmental justice analysis are those of the Council on Environmental Quality, whose definitions are widely used when assessing environmental justice in the environmental review process. In this analysis, a minority population is a non-Caucasian population over 50 percent. Racial composition data from the 2000 U.S. Census were evaluated to determine the percentage of minority households within the project area and Sonoma County.

Income data from the 2000 U.S. Census were evaluated to determine the percentage of households within the project area and Sonoma County that are living at or below poverty level. Low-income areas are defined as areas in which the percentage of the population below poverty status exceeds the average poverty level of Sonoma County (4.7 percent).

3.6.4 CEQA Thresholds of Significance Criteria

Because Environmental Justice is not a CEQA issue, no formal, commonly accepted significance criteria have been adopted for Environmental Justice impacts. However, the Presidential Memorandum accompanying Executive Order 12898 directs federal agencies to include measures to mitigate disproportionately high and adverse environmental effects of proposed federal actions on minority and low-income populations. Federal agencies also are required to give affected communities opportunities to provide input into the NEPA process, including identification of mitigation measures. No specific significance thresholds have been developed, but for the purposes of this analysis, the project would have significant environmental justice impacts based on the evaluation criteria/thresholds of significance listed in Table 3.6-4.

Table 3.6-4. CEQA Evaluation Criteria/Thresholds of Significance

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will the NSCARP result in significant adverse environmental impacts on a community largely comprised of minority or low-income persons?	Percentage of households within the project area comprised of minority or low-income persons.	Greater percentage of affected minority or low-income persons within the project area than in Sonoma County as a whole.	Presidential Memorandum accompanying Executive Order 12898.
2. Will the NSCARP result in any disproportional significant adverse human health or environmental effects on minority or low-income persons?	Percentage of households within the project area comprised of minority or low-income persons.	Greater percentage of affected minority or low-income persons within the project area than in Sonoma County as a whole.	Presidential Memorandum accompanying Executive Order 12898.

3.6.4 Alternatives Analysis

For the purposes of this analysis, a disproportionate effect is an impact that would occur to either an ethnic minority population or a low-income population in a different manner than it would occur to the entire, collective population of the project area.

Alternative 1 – No Project/Action

Under the No Project Alternative, NSCARP would not be built. As such, the adverse impacts associated with temporary construction activities would not occur under the No Project Alternative. Implementation of this Alternative would result in a continuation of existing irrigation practices and no disproportionate impacts to minority or low-income households would result; therefore, conditions under this alternative would be identical to those under existing conditions.

Because the No Project Alternative would result in no change to existing conditions, this impact is considered less-than-significant. The No Project Alternative, however, would not meet the goals and objectives of the NSCARP.

Alternative 2 – Entire NSCARP

Impact ENV-1: The NSCARP could result in significant adverse environmental impacts on a minority and/or low-income community.

Discussion: Due to the composition of possible minority and/or low-income households within the project area, certain impacts of the project could have the potential to result in disproportional effects on these populations. An assessment of the project-related impacts identified in the other resource sections was conducted to determine which, if any, of these impacts could result in disproportional effects on minority and/or low-income households. Adverse project-related effects, such as noise, air pollutant emissions, soils and water quality effects, and traffic delays resulting from construction activities would be temporary. Neither the temporary or long-term impacts of the project would occur disproportionately to minority nor low-income populations (see ENV-2 discussion), and the project would, therefore, not cause disproportionately high and adverse effects on any minority or low-income populations as per Executive Order 12898.

The SCWA and Reclamation have engaged stakeholders for input at all levels of the project decision-making process to ensure early, accessible, and meaningful participation. By stakeholders' participation, the agencies have included them in the decision-making process and have explored opportunities to address environmental justice within current statutory and regulatory structure. This is considered a less than significant impact.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 1

Mitigation Measure: None required

Impact ENV-2: NSCARP could result in disproportional significant adverse human health or environmental effects on a minority and/or low-income community.

Discussion: Based on 2000 U.S. Census data, the block groups that encompass the project area have a minority (non-Caucasian) population of 19.5 percent. Sonoma County has a minority population (non-Caucasian) population of 18.4 percent. Though the project area contains a higher minority population, the project area does not have a minority population greater than 50 percent. Because construction and operation of the NSCARP would not result in disproportional significant adverse human health or environmental effects on minority persons, this impact is considered less than significant.

Based on 2000 U.S. Census data, the average percentage of the population below poverty status for the block groups that encompass the project area is 3.8 percent, which is lower than the percentage of the population below poverty status within Sonoma County. Because the percentage of households below poverty status that would have the potential to be impacted by the NSCARP is less than the Sonoma County average of households below the poverty level, the NSCARP would not result in disproportional significant adverse human health or environmental effects on low-income persons. This is considered a less than significant impact.

Impact Category: Less than Significant

Threshold of Significance Criterion: 2

Mitigation Measure: None required

Alternative 3 – Alexander Valley-Jordan Reservoir Subset

The study area for environmental justice analysis is located in the same region as Alternative 2; however, is smaller in scale. Alternative 3 would not result in any housing or displacement impacts or intrude on any land-based development. Adverse project-related effects, such as noise, air pollutant emissions, soils and water quality effects, and traffic delays resulting from construction activities would be similar to Alternative 2.

Table 3.6-5. Population and Percent of Total by Race for the Alternative 3 Area

Population and Percent of Total by Race for Alternative 3 Area									
Project Area	Race								Hispanic or Latino (of any race)
	One Race							Two or More Races	
	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Total		
	2,396	15	111	19	0	488	3,171	142	997
	75.6%	0.5%	3.5%	0.6%	0%	15.4%	X	4.5%	31.4%

Source: U.S. Census Bureau, 2000.

Note that the census data referenced for the Alternative 3 area in Table 3.6-5 above, includes data for two block groups that encompass a much larger area than the Alternative 3 area. Block group data referenced below include Census Tract 1539.01, Block Group 1 and Census Tract 1541, Block Group 2.

Though the Alternative 3 area contains a higher minority population than the County as a whole, the project area does not have a minority population greater than 50 percent. Based on the data presented in Table 3.6-3 above, the average percentage of the population below poverty status for the block groups that encompass the Alternative 3 area is 2.9 percent, which is lower than the percentage of the population below poverty status within Sonoma County.

Neither the temporary or long-term impacts of Alternative 3 would occur disproportionately to minority or low-income populations; therefore, would not cause disproportionately high and adverse effects on any minority or low-income populations as per Executive Order 12898 regarding environmental justice.

Alternative 4 – Russian River Valley-Westside Subset

The study area for environmental justice analysis is located in the same region as Alternative 2. Alternative 4 would not result in any housing or displacement impacts or intrude on any land-based development. Adverse project-related effects, such as noise, air pollutant emissions, soils and water quality effects, and traffic delays resulting from construction activities would be similar to Alternative 2.

Table 3.6-6. Population and Percent of Total by Race for the Alternative 4 Area

Population and Percent of Total by Race for Alternative 4 Area									
Project Area	Race								Hispanic or Latino (of any race)
	One Race							Two or More Races	
	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Total		
	1,206	1	16	22	4	154	1,459	56	335
	82.7%	0.1%	1.1%	1.5%	0.3%	10.6%	X	3.8%	23.0%

Source: U.S. Census Bureau, 2000.

Note that the census data referenced for the Alternative 4 area in Table 3.6-6 above, includes data for two block groups that encompass a much larger area than the Alternative 4 area. Block group data referenced below include Census Tract 1537.05, Block Group 1 and Census Tract 1540, Block Group 2.

The Alternative 4 area contains a lower percentage of minority population than the County as a whole. Based on the data presented in Table 3.6-3 above, the average percentage of the population below poverty status for the block groups that encompass the Alternative 3 area is 2.9 percent, which is lower than the percentage of the population below poverty status within Sonoma County.

Neither the temporary or long-term impacts of Alternative 4 would occur disproportionately to minority or low-income populations; therefore, would not cause disproportionately high and adverse effects on any minority or low-income populations as per Executive Order 12898.

3.7 GEOLOGY, SOILS, AND SEISMICITY

This section describes the basic geologic setting in the study area, the regulatory framework, and provides information regarding potential impacts related to geological hazards, earthquakes, soils, and induced seismicity and unique geological features.

3.7.1 Physical Setting

Regional Geologic Setting

The proposed NSCARP includes the Alexander Valley, Dry Creek Valley, and portions of the Russian River Valley, located in northeastern Sonoma County and lies east of the San Andreas Fault Zone. The northwest-trending San Andreas Fault Zone is the junction between two tectonic plates: the North American Plate, which forms the land mass to the east, and the Pacific Plate, which is mostly under the Pacific Ocean. The movement between these two plates, over many millions of years, has produced the northwest-trending ridges and valleys present in Sonoma County and throughout the Coast Ranges. The plate boundary is defined by many nearly parallel faults, which, together with the San Andreas Fault, are the main sources of seismic activity in the study area.

The geologic units that underlie the NSCARP are depicted on the Santa Rosa Quadrangle geologic map of the California Division of Mines and Geology (CDMG) Regional Geologic Map Series and described in the geology of the Santa Rosa Quadrangle (Wagner and Bortugno 1983). The oldest geologic units in the study area are the Franciscan Complex, which is Jurassic (208 to 146 million years ago (MYA) to Early Cretaceous (146 to 106 MYA) in age and the Great Valley Group which is Early Cretaceous. The Franciscan Complex consists of folded and faulted sandstones, shale, conglomerates, chert, greenstone, and serpentinite rocks. In some areas these rocks occur as large intact blocks, and in others may occur as mélange (meaning a mixture of rocks)[1]. The Great Valley Group consists of various sedimentary materials such as marine mudstones, sandstones, and conglomerates. Much younger Miocene (5 to 23 MYA) to Pliocene (1.8 to 5 MYA) sedimentary rocks, including the Wilson Grove Formation[2] (marine sandstone, conglomerate, and tuff) and the Petaluma Formation (mostly non-marine claystone, mudstone, and siltstone) were deposited on top of the Franciscan Complex. During Pliocene time volcanic activity created widespread deposits of the Sonoma Volcanics (basalt, andesite, rhyolite, tuff, and other volcanic rocks) in the eastern portion of the County. Pleistocene (1.8 MYA to 11,000 years ago) to Holocene (<11,000 years ago) alluvium, including the Glen Ellen Formation, mostly found in northwest-trending valleys, constitutes the youngest geologic unit in the area.

Topography

The project area topography is typical of the Coast Ranges of Northern California, where surface relief is dominated by long northwest-southeast trending ridges and similarly aligned

1 A chaotic mixture of intact sandstone, greenstone, blueschist, silica-carbonate, and chert in a sheared or crushed matrix of shale.

2 This unit was formerly known as the Merced Formation and is currently referred to as the Wilson Grove Formation.

valleys. The proposed project area is located within the Russian River watershed, the headwaters of which originate approximately 15 miles north of Ukiah. The mountains of the Coast Range to the west of the Russian River watershed reach peak elevations between 1,000 and 3,500 feet above mean sea level (MSL) with slopes commonly exceeding 30 percent. East of the project area is the Mayacamas Range with peak elevations from 3,000 to 4,500 MSL. In general, the each of the project sub-areas traverses a variety of topographic conditions. The relatively flat areas of the valley floors (slopes 5 percent or less) have a low potential for slope instability, with the exception of river and stream margins.

Potter Valley, Redwood Valley, Ukiah Valley, Hopland Valley, Alexander Valley, and the Santa Rosa Plain are the major valleys of the Russian River watershed. Each of the valleys is separated by narrow, gorge sections of the river. Valleys along the Russian River range in elevation from 1,100 MSL in the northern Potter and Redwood valleys to 90 feet MSL at the southern end of the Santa Rosa Plain. As the Russian River cuts westerly from the Santa Rosa Plain through the coastal mountain ranges, the elevation of the river gradually declines until it reaches sea level at the river's mouth near Jenner. The major valleys, other smaller valleys, and other level areas together comprise approximately 15 percent of the Russian River watershed. The remainder of the watershed is hilly to mountainous with approximately 45 percent of the watershed at higher elevations in excess of 1,000 MSL.

Historical Seismicity

The proposed project area is located in a seismically active region where earthquakes are a common occurrence. Since the mid-nineteenth century, several hundred earthquakes have been felt in Sonoma County. A few of these earthquakes were strong enough to cause damage. In the 1800's, five moderate earthquakes occurred in the Santa Rosa area. Three of these earthquakes caused localized minor damage such as broken chimneys in Santa Rosa in 1865, 1893, and 1899. The earthquakes ranged in magnitude from less than 4 to 5.1. The first two epicenter locations were inferred to be in Bennett Valley and the third in Santa Rosa based on detailed analysis of historical accounts and newspaper records (Toppozada, Real, and Parke, 1981). In 1891, a magnitude 5.5 earthquake centered near Napa caused minor damage in Santa Rosa, and in 1898 a strong earthquake (magnitude 6.2) centered east of the southern end of the Rodgers Creek Fault, caused structural damage in Santa Rosa.

The great San Francisco earthquake of 1906 on the San Andreas Fault had an estimated magnitude of 7.9. The geology, geophysics, and damage reports of this earthquake were reported by the State Earthquake Investigation Commission (Lawson, 1908). The 1906 earthquake caused extensive damage in San Francisco and in other communities in the Bay Area. Santa Rosa, Sebastopol, and Fort Bragg sustained relatively more damage than most other places in California during the earthquake. In Santa Rosa strong groundshaking and a fire in the downtown area resulted in extensive property damage in the business district. Approximately 61 people were killed in Santa Rosa (Lawson, 1908).

Groundshaking intensity effects from the 1906 earthquake varied throughout the NSCARP area and its vicinity. The extent of damage was influenced by geologic conditions, the design and workmanship of building construction, and other factors. Damage reports from Santa Rosa and Sebastopol of collapsed buildings and ground cracking indicate groundshaking intensities of IX to X on the Modified Mercalli Scale (see Table 3.7-2).

The October 1969 magnitude 5.6 and 5.7 earthquakes on the Healdsburg Fault caused several million dollars of damage in Santa Rosa and the vicinity. Numerous breaks in the water pipeline system occurred in the eastern part of Santa Rosa. More recently, the magnitude 4.9 earthquake along the Hayward Fault (26 January 1986) and the magnitude 7.1 Loma Prieta earthquake on the San Andreas Fault (17 October 1989) were felt in the County, but no damage was reported to major pipeline facilities.

Numerous instances of ground failure and liquefaction effects were recorded after the 1906 earthquake and again in 1969. These soil failures occurred predominantly in marshy ground and areas near the trace of the Healdsburg-Rodgers Creek Fault in central Santa Rosa. In 1969, ground cracking was common along the banks of Matanzas Creek and Santa Rosa Creek (Youd and Hoose, 1978) in Santa Rosa.

Recently, the United States Geological Survey (USGS) Working Group on California Earthquake Probabilities published a report on the probabilities for large earthquakes on the San Francisco Bay Area faults (USGS, 1999). They estimate that there is a 70 percent probability of a large (magnitude greater than 6.7) earthquake before the year 2030 on one of the Bay Area faults. Separate probabilities for large earthquakes on the individual faults were also calculated, with the Hayward-Rodgers Creek Fault having the highest probability of 32 percent. The San Andreas Fault has a calculated probability of 21 percent (USGS, 1999). Thus, from 2000 to 2030, there is a 50 percent probability of an earthquake occurring within twenty miles of the NSCARP area and vicinity, and a 70 percent probability of a regional earthquake that would affect the NSCARP area within 30 years[3].

An earthquake intensity scale, known as the Modified Mercalli scale, is useful in describing the ground-shaking effects of an earthquake at a given location. The Richter Scale on the other hand, which is based on magnitude, measures the total energy released in an earthquake and does not account for distance from the epicenter or soil type. Table 3.7-1 provides a description of the Mercalli scale.

Table 3.7-1. Modified Mercalli Intensity (MMI) Scale

Class	Description
I	Not felt except by a very few under especially favorable circumstances.
II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibration like passing of truck. Duration estimated.
IV	During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably.

[3] Because these estimates are based on the estimated recurrence interval of earthquakes on each fault and several years have elapsed since the analysis without a major earthquake, current probabilities would be slightly higher than those calculated for the 1999 report.

Table 3.7-1. (Continued)

Class	Description
V	Felt by nearly everyone, many awakened. Some dishes, windows, etc broken; cracked plaster in a few places; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster and damaged chimneys. Damage slight.
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving cars.
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving cars disturbed.
IX	Damage considerable in specially designed structures; well designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed, slopped over banks.
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
XII	Damage total. Waves seen on ground surface. Lines of sight and level distorted. Objects thrown into the air.

Area Faults

There are several fault zones within Sonoma County that could affect NSCARP facilities. These include active faults, which are faults that may have been historically active (during the last 200 years) or active in the geologically recent past (about the last 11,000 years, usually referred to as Holocene in the geologic time scale). Faults that have been active at some time during the Quaternary geologic period (the last two million years) are classified as potentially active.

For purposes of this discussion, the faults that transverse the proposed project area and that could directly affect the proposed project are the Healdsburg/Rogers Creek, Maacama, and the smaller Chianti Fault (see Figure 3.7-1 – Earthquake Fault Lines). Figure 3.7-1 also shows other regional faults which could affect the proposed project. Faults not shown in Figure 3.7-1 would not significantly affect NSCARP facilities because of their age, distance, or seismic potential.

Soils

Soil mapping units in the NSCARP area are described in Table 3.7-2. The soils in the eastern

Table 3.7-2. Soil Mapping Units and Characteristics Recorded at the NSCARP Project Area

Soil Mapping Unit (Taxonomic Class)	Munsell Soil Color (by horizon)	Drainage Class[1]	PERM[2]	AWC[3]	Runoff[4]	ERD[5]	Hydric
Alluvial land, sandy		--	--	--	--	--	Yes
Alluvial land, clayey		--	--	--	--	--	Yes
Arbuckle gravelly sandy loam, 0-5% slopes (mixed thermic Mollic Haploxeralfs)	6-15” 10YR4/3 wet	3	3	4	2	--	No
Arbuckle gravelly sandy loam, 5-15% slopes (mixed thermic Mollic Haploxeralfs)	“	3	3	4	3	--	No
Arbuckle gravelly loam, 0-5% slopes (mixed thermic Mollic Haploxeralfs)	“	3	3	4	2	--	No, but can have inclusions
Arbuckle gravelly loam, 5-9% slopes (mixed thermic Mollic Haploxeralfs)	“	3	3	4	3	--	No
Boomer loam, 15-30% slopes (mesic Utic Haploxeralfs)	11-19” 5YR3/4 wet	3	4	4	4	2	No
Boomer loam, 30-50% slopes (mesic Utic Haploxeralfs)	“	3	4	4	5	2	No
Boomer loam, 50-75% slopes (mesic Utic Haploxeralfs)	“	3	4	4	5	2	No
Cibo clay, 15-50% slopes (thermic Typic Chromoxererts)	0-11” 10YR3/2 wet	3	2	3	2	--	No
Clear Lake clay loam, 2-5% slopes (thermic Typic Pelloxerents)	8-25” 10YR2/1 wet	6	2	3	2	--	Yes
Clear Lake clay, ponded, 2-5% slopes (thermic Typic Pelloxerents)	8-25” 10YR2/1 wet	6	2	3	2	--	Yes
Clough gravelly loam, 2-9% slopes (thermic Abruptic Durixeralfs)	10-18” 5YR5/6 wet	4	1	2	3	--	No
Clough gravelly loam, 9-15% slopes (thermic Abruptic Durixeralfs)	“	4	1	2	4	--	No

Table 3.7-2. (Continued)

Soil Mapping Unit (Taxonomic Class)	Munsell Soil Color (by horizon)	Drainage Class[1]	PERM[2]	AWC[3]	Runoff[4]	ERD[5]	Hydric
Clough gravelly loam, 15-30% slopes (thermic Abruptic Durixeralfs)	“	4	1	1	4	--	No
Cole silt loam, 0-2% slopes (thermic Pachic Argixerolls)	8-18” 10YR3/2 wet	5	2	5	3	--	No, but can have inclusions
Cole clay loam, 0-2% slopes (thermic Pachic Argixerolls)	“	5	2	5	2	--	No, but can have inclusions
Cole clay loam, 2-5% slopes (thermic Pachic Argixerolls)	“	5	2	5	2	--	No
Cortina gravelly sandy loam, 0-2% slopes (thermic Typic Xerofluvents)	7-17” 10YR3/1 wet	1	7	2	3	1	No, but can have inclusions
Dibble clay loam, 2-9% slopes (thermic Typic Haploxeralfs)	10-16” 2.5YR4/2 wet	3	2	4	4	--	No
Dibble clay loam, 9-15% slopes (thermic Typic Haploxeralfs)	“	3	2	3	5	--	No
Empire loam, 9-30% slopes (isomesic Typic Tropojumults)	4-11” 10YR3/2 wet	3	4	5	4	2	No
Felta very gravelly sandy loam, 15-30% slopes (thermic Typic Argixerolls)	5-14” 10YR3/2 wet	3	4	3	4	--	No
Felta very gravelly sandy loam, 30-50% slopes (thermic Typic Argixerolls)	“	3	4	3	5	--	
Goldridge fine sandy loam, 9-15% slopes (mesic Typic Hapludults)	7-20” 10YR4/4 wet	4	3	5	4	--	No
Goldridge fine sandy loam, 15-30% slopes (mesic Typic Hapludults)	“	4	3	5	4	--	No
Goldridge fine sandy loam, 30-50% slopes (mesic Typic Hapludults)	“	4	3	5	5	--	No

Table 3.7-2. (Continued)

Soil Mapping Unit (Taxonomic Class)	Munsell Soil Color (by horizon)	Drainage Class[1]	PERM[2]	AWC[3]	Runoff[4]	ERD[5]	Hydric
Guenoc gravelly silt, 5-30% slopes (thermic Typic Rhodoxeralfs)	4-17” 10YR3/3 wet	3	3	3	4	--	No
Haire gravelly loam, 0-9% slopes (thermic Typic Palexerolls)	7-12” 10YR3/2 wet	4	2	3	3	--	No, but can have inclusions
Haire clay loam, 0-9% slopes (thermic Typic Palexerolls)	“	4	2	3	3	--	No, but can have inclusions
Haire clay loam, 9-15% slopes (thermic Typic Palexerolls)	“	4	2	3	4	--	No
Hugo-Josephine complex, 9-30% slopes	8-16” 10YR4/3 wet	3	--	5	4	--	No
Huichica loam, 2-9% slopes (thermic Abruptic, Haplic, Durixeralfs)	7-14” 10YR4/3 wet	4	1	2	2	--	No, but can have inclusions
Huichica loam, 9-15% slopes (thermic Abruptic, Haplic, Durixeralfs)	“	4	1	2	2	--	No
Huichica loam, shallow, ponded, 0-5% slopes (thermic Abruptic, Haplic, Durixeralfs)	“	5	1	5	1	--	Yes
Josephine loam, 9-30% slopes (mesic Typic Haploxerults)	0-13” 5YR3/3 wet	3	4	4	4	--	No
Josephine loam, 30-50% slopes (mesic Typic Haploxerults)	“	3	4	4	5	--	No
Laniger loam, 9-15% slopes (thermic Typic Vitrandepts)	6-17” 10YR2/2 wet	3	4	3	4	--	No
Laniger loam, 15-30% slopes (thermic Typic Vitrandepts)	“	3	4	2	5	--	No, but can have inclusions
Laughlin loam, 2-30% slopes (mesic Typic Xerochrepts)	4-22” 10YR3/2 wet	3	4	2	4	--	No

Table 3.7-2. (Continued)

Soil Mapping Unit (Taxonomic Class)	Munsell Soil Color (by horizon)	Drainage Class[1]	PERM[2]	AWC[3]	Runoff[4]	ERD[5]	Hydric
Laughlin loam, 30-50% slopes (mesic Typic Xerochrepts)	"	3	4	2	5	--	No
Los Gatos loam, 30-75% slopes (mesic Typic Argixerolls)	7-17" 5R4/4 wet	3	3	3	6	--	No
Los Gatos gravelly loam, 30-75% slopes (mesic Typic Argixerolls)	"	3	3	3	6	--	No
Manzanita gravelly silt loam, 0-9% slopes (thermic Ultic Haploxeralfs)	4-12" 5R3/4 wet	4	3	5	3	--	No
Montara cobbly clay, 2-30% slopes (thermic Lithic Haploxerolls)	0-9"	3	3	1	3	--	
Pajaro gravelly loam, 0-5% slopes (mesic Typic Haploquolls)	4-35" 10YR4/1 wet	5	3	4	2	--	No, but can have inclusions
Pajaro clay loam, 0-2% slopes (mesic Typic Haploquolls)	"	5	3	5	1	--	Yes
Pleasanton loam, 0-2% slopes (thermic Mollic Haploxeralfs)	7-17" 10YR2/2 wet	3	3	5	2	--	No
Pleasanton loam, 2-9% slopes (thermic Mollic Haploxeralfs)	"	3	3	5	3	--	No
Pleasanton gravelly loam, 2-5% slopes (thermic Mollic Haploxeralfs)	"	3	3	4	2	--	No
Positas gravelly loam, 0-9% slopes (thermic Mollic Palexeralfs)	7-15" 5YR3/3 wet	3	1	3	3	--	No
Raynor clay, 15-30% slopes (thermic Chromic Entic Pelloxerents)	0-17" N2/0 wet	3	2	3	5	--	No
Raynor-Montara complex, 0-30% slopes (thermic Chromic Entic Pelloxerents)	"	3	2	4	4	--	No

Table 3.7-2. (Continued)

Soil Mapping Unit (Taxonomic Class)	Munsell Soil Color (by horizon)	Drainage Class[1]	PERM[2]	AWC[3]	Runoff[4]	ERD[5]	Hydric
Red Hill clay loam, 30-50% slopes (mesic Ultic Palexerolls)	3-16” 5YR3/3 wet	4	3	5	5	--	No
Riverwash		--	--	--	--	--	Yes
Sobrante loam, 15-30% slopes (thermic Mollic Haploxeralfs)	7-20” 5YR3/4 wet	3	4	3	4	--	No
Sobrante loam, 30-50% slopes (thermic Mollic Haploxeralfs)	“	3	4	3	5	--	No
Spreckles loam, 9-15% slopes (thermic Ultic Patexeralfs)	9-18” 10YR3/2 wet	3	2	4	4	2	No
Spreckles loam, 15-30% slopes (thermic Ultic Patexeralfs)	“	3	2	4	5	2	No
Suther loam, 15-30% slopes (mesic Aquic Haploxeralfs)	3-14” 10YR4/2 wet	4	2	3	4	--	No
Suther loam, 30-50% slopes (mesic Aquic Haploxeralfs)	“	4	2	3	5	--	No
Suther-Laughlin loam, 15-50% slopes (mesic Aquic Haploxeralfs)	“	4	2	3	5	--	No
Toomes rocky loam, 2-30% slopes (thermic Lithic Xerothents)	4-13” 7.5YR3/3 wet	3	4	2	2	--	No
Toomes rocky loam, 30-75% slopes (thermic Lithic Xerothents)	“	3	4	2	5	--	No
Yolo sandy loam, 0-2% slopes (thermic Typic Xerothents)	8-60” 10YR3/3 wet	3	4	4	3	--	No
Yolo sandy loam overwash, 0-5% slopes (thermic Typic Xerothents)	“	3	4	4	3	--	No, but can have inclusions
Yolo loam, 0-2% slopes (thermic Typic Xerothents)	“	3	4	5	2	--	No

Table 3.7-2. (Continued)

Soil Mapping Unit (Taxonomic Class)	Munsell Soil Color (by horizon)	Drainage Class[1]	PERM[2]	AWC[3]	Runoff[4]	ERD[5]	Hydric
Yolo loam overwash, 0-5% slopes (thermic Typic Xerothents)	"	3	4	5	3	--	No, but can have inclusions
Yolo gravelly loam, 0-5% slopes (thermic Typic Xerothents)	"	3	4	5	3	--	No, but can have inclusions
Yolo silt loam, 0-2% slopes (thermic Typic Xerothents)	"	3	4	5	3	--	No
Yorksville clay loam, 5-30% slopes (mesic Pachic Argixerolls)	8-14" 2.5YR3/2 wet	4	1	3	4	--	No, but can have inclusions
Yorksville clay loam, 30-50% slopes (mesic Pachic Argixerolls)	"	4	1	3	5	--	No, but can have inclusions
Yorksville-Suther complex, 0-50% slopes (mesic Pachic Argixerolls)	"	4	1	3	4	--	No, but can have inclusions
Zamora silty clay loam, 0-2% slopes (thermic Mollic Haploxeralfs)	5-17" 10YR3/1 wet	3	3	5	2	--	No, but can have inclusions
Zamora silty clay loam, 2-5% slopes (thermic Mollic Haploxeralfs)	"	3	3	5	3	--	No, but can have inclusions

Sources: Miller (1972), Soil Conservation Service (1992)

CODES

[1]Drainage Class
1 Excessively drained
2 Somewhat excessively drained
3 Well drained
4 Moderately well drained
5 Somewhat poorly drained
6 Poorly drained
7 Very poorly drained

[2]PERM (Permeability)
1 Very slow (< 0.06 inch)
2 Slow (0.06 to 0.2 inch)
3 Moderately slow (0.2 to 0.6 inch)
4 Moderate (0.6 to 2 inches)
5 Moderately rapid (2 to 6 inches)
6 Rapid (6 to 20 inches)
7 Very rapid (>20 inches)

[3]AWC (Available Water Capacity)
1 Very low (0 to 2.5 inches)
2 Low (2.5 to 5 inches)
3 Moderate (5 to 7.5 inches)
4 High (7.5 to 10 inches)
5 Very High (> 10 inches)

[4]Surface Runoff
1 Negligible
2 Very low
3 Low
4 Medium
5 High
6 Very high

[5]ERD (Effective Rooting Depth)
1 Very deep (> 60 inches)
2 Deep (40 to 60 inches)
3 Moderately deep (20 to 40 inches)
4 Shallow (10 to 20 inches)
5 Very shallow (< 10 inches)

Figure 3.7-1. Earthquake Fault Lines

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portion of the project area are mostly serpentinitic Lithic Argixerolls and Haploxerolls and non-serpentinitc Dystric Lithic Xerochrepts and Typic and Mollic Haploxeralfs (Miles and Goudey, 1997). Soil temperature regimes are mostly thermic, but are mesic on some north-facing slopes and at higher elevation. Soil moisture regimes are xeric. Along the west side of the project area, the soils are mostly Ultic Haplustalfs and Ultic and Typic Haploxeralfs. The soil temperature regimes are predominantly isomesic, and mesic, and soil moisture regimes are predominantly ustic and xeric (nearly udic or ustic) (Miles and Goudey, 1997). Based on a review of the Soil Survey of Sonoma County, California (Miller, 1972), the project area is underlain by 34 soil series and 67 soil mapping units.

Mineral Resources

The California Geological Survey (CGS) classifies the regional significance of mineral resources in accordance with the California Surface Mining and Reclamation Act of 1975 (SMARA). Mineral Resource Zones (MRZ) have been designated to indicate the significance of mineral deposits. The MRZ categories are as follows:

- MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence;

- MRZ-2: Areas where adequate information indicates significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence;

- MRZ-3: Areas containing mineral deposits the significance of which cannot be evaluated from available data; and,

- MRZ-4: Areas where available information is inadequate for assignment to any other MRZ.

Aggregate resources associated with river deposits are the dominant mineral mined in this area (Sonoma County, 1998). Portions of the Russian River within the Northern Alexander, Alexander and Russian River Valley sub-areas contain MRZ-2 zones parallel to the river course.

Soil Hazards

Soils hazards fall into a number of categories, some of which overlap with seismic hazards (i.e. liquefaction). This section discusses, in general terms, a variety of soil-related issues and considerations that would pertain to the project. For example, soil permeability affects the suitability of land for irrigation, for construction of dam embankments, or for lining reservoirs. Soils with very slow to moderate percolation rates (which predominate in the NSCARP area) have low to moderate permeability. Soils that have low permeability are potential sources of clay for lining ponds or creating the impervious core zone for dam embankments.

Expansive and Corrosive Soils

Expansiveness or the potential to swell and shrink with repeated cycles of wetting and drying, is another common characteristic of many soils in the NSCARP area and can cause distress to structure foundations. Expansive soils tend to be weak and compressible and may not provide adequate support for foundations unless they are specially treated. Sometimes these soils must be removed entirely and replaced with engineered backfill. If left in place, these weak soils can cause unacceptable amounts of settlement and may require special foundation designs.

Corrosive soils also exist in the region where the NSCARP is located. These soils can corrode and degrade the structural integrity of underground irrigation pipelines unless non-corrodible components are incorporated into project materials.

Erosion

Erosion potential is variable throughout the proposed project area. Silty soils are generally readily erodable whereas sandier soils are less susceptible to erosion. Excessive erosion in the vicinity of building and pipeline structures can result in the loss of foundation support. Excessive erosion could also contribute to reservoir siltation (i.e., the reservoir filling up with silt).

Liquefaction

A common hazard related to severe groundshaking in loose saturated sandy soils is liquefaction. This transformation from a solid to a liquid ("quicksand") state can cause ground settling, landslide, and lateral spreading[4]. Alluvial areas adjoining streams, valleys, and shorelines are areas where liquefaction is likely to occur if specific conditions exist, such as loose sandy deposits and high groundwater conditions. If loose granular soils (predominately silt and fine sand) are present, and seasonal maximum groundwater levels are within 20 feet of the ground surface, there is a high potential for liquefaction. If groundwater levels in liquefaction-prone soils are between 20 and 50 feet below the ground surface (bgs), there is a moderate potential for liquefaction to occur (CDMG, 1974). Liquefaction in sediment where the groundwater is more than 50 feet bgs does not generally result in groundsurface failure.

Subsidence and Settlement

Subsidence and settlement are localized site-specific kinds of geologic hazards. Most subsidence is caused by the withdrawal of fluids (e.g., ground water or oil) from subsurface reservoirs or from the collapse of surface and near surface soils and rocks over subterranean voids such as mines and caves. This type of subsidence has thus far not been reported in Sonoma County. Settlement, a kind of subsidence, is a more localized phenomenon and is related to the loading of soils and their subsequent compression as a result of construction activities. Settlement can result if the native soils are porous or weak such that the weight to a building or other structure causes the soil to compress. This can occur in native soils or in manmade fills. Settlement is the depression of the bearing soil when a load, such as that of a building or new fill material, is placed upon it. The process whereby soil materials settle at varying rates depending on the load weight is referred to as differential settlement. Differential settlement can be a greater hazard than total settlement if there are variations in the thickness of previous and new fills or natural variations in the thickness and compressibility of soils across a given area.

[4] Lateral spreading may result if liquefaction occurs in material that makes up a steep slope, particularly a free-face, such as along a riverbank.

Seismically induced settlement refers to settlement of unsaturated granular material as a result of densification and particle rearrangement due to earthquake shaking. Seismically induced settlement differs from settlement resulting from liquefaction because there is not a buildup of excess pore water pressure during the seismic shaking.

Land Stability

Major stability hazards present within the proposed project area are generally due to unstable geologic conditions in the form of landslide potential, liquefaction potential, potential seismic activity, shaking amplification due to materials, or some combination of these. This section discusses some of the mechanisms of geologic instability.

Slope Instability

Landsliding is a natural process in the Coast Ranges and is a common occurrence in certain types of geologic materials. Geologic materials rich in clay minerals have a great capacity to absorb water, and as water content increases, shear strength -- the force that keeps land from sliding -- decreases. Among the potentially unstable geologic formations in Sonoma County are the clay-rich Petaluma Formation and the sheared and fractured shale matrix of the Franciscan Complex. Another unstable configuration may occur where the angle of dip of bedding planes and the cut slope result in the daylighting of bedding or bedding planes close to parallel with the groundsurface. In these cases, the potential exists for rock units to slip along a weakened bedding plane.

The steepness of a slope is a major factor in slope stability. Human modifications of topography and drainage such as road cuts, surface runoff diversion, or impounding of water can reduce the natural shear strengths of slopes and contribute to landslide, even in areas of normally low susceptibility.

Several other conditions can cause, or contribute to, slope instability. Heavy rains can saturate slopes, reduce shear strength, and result in failure. Stream cuts along the base of a slope can undermine the slope and possibly induce sliding. Chemical and mechanical weathering can break down rock materials, and the seepage from high groundwater levels can increase water content, thus reducing strength.

Within the NSCARP area, a variety of topographic conditions exist, from relatively flat valley floors with very little slope instability, to steeply sloped (30 percent or more) hilly areas. Potential for landsliding over the proposed project area also varies greatly. The relatively flat areas of the valley floors have a low potential for slope instability with the exception of some stream and river margins. The surrounding hilly areas, especially the Alexander Valley Bench and the western third of the Russian River Valley have a preponderance of land prone to landslides. This is expected given the steep terrain.

Earthquake-Induced Slope Instability

Bedrock formations and unconsolidated deposits (soils) respond differently to seismically induced groundshaking. As a general rule, the severity of groundshaking increases with proximity to the epicenter of the earthquake. However, given similar location and seismic energy output, the least amount of damaging vibration would occur on a site that was entirely underlain by bedrock. A site underlain by a major thickness of alluvium would experience considerably more damaging vibration because of the unconsolidated material's tendency to deform to a greater degree than the bedrock.

For a detailed explanation of geologic conditions in the proposed project sub-areas of the Russian River Valley, Alexander Valley and Dry Creek Valley, please refer to “Geologic Conditions in Proposed Project Area”.

Seismic Hazards

Seismic hazards include groundshaking, surface rupture along active faults, and liquefaction. Strong groundshaking can damage structures, their foundations, and their contents. Strong groundshaking may also trigger secondary effects such as liquefaction or ground settlement in some areas. Groundshaking of intensity IX on the Modified Mercalli Scale (Table 3.7-1) could damage well-built structures and rupture pipes.

Damage due to surface rupture is limited to the actual location of the fault-line, unlike damage from groundshaking that can occur at great distances from the fault. Surface rupture could damage buried pipelines that have not been adequately protected where they cross fault traces. In the proposed project area and vicinity, the Healdsburg-Rodgers Creek and the Maacama Faults are active faults with potential for surface rupture that could affect NSCARP facilities. For a discussion of liquefaction, please refer to “Soil Hazards”.

Storage reservoir-induced seismicity research, including studies of thousands of case histories, indicates that a few, very large, reservoirs have induced large earthquakes (greater than magnitude 5) due to the weight of the stored water. However, a reservoir water depth of at least 260 feet is required to induce seismicity. Induced earthquakes large enough to be damaging have never been documented to occur in reservoirs with lesser water depths. Even smaller seismic events have been convincingly documented in a total of only 16 cases out of some 11,000 worldwide "large" dams (Allen, 1982).

Geologic Conditions in Proposed Project Area

The proposed NSCARP project area in northern Sonoma County includes the Alexander Valley, Dry Creek Valley, and the Russian River Valley, each of which comprise project sub-areas.

General Geology

Alluvium dominates the surface geology of the central part of the valleys in this part of the NSCARP area. The area between the Dry Creek Valley and the Alexander Valley is comprised mostly of the Lower Cretaceous Great Valley Sequence (Kl). East of the Alexander Valley, the Franciscan Complex (Kjf) predominates. Outcrops of Coast Range Ophiolite Volcanic Rocks are interspersed throughout the area. Figure 3.7-2 depicts the landslide distribution relating to general slope conditions using the cities of Healdsburg and Cloverdale as reference points[5].

[5] The Many Landslides category shown on Figure 3.7-2 are mapped and defined by quadrangle; thus, the extent boundaries of the map are limited to areas in which the unit was defined.

Faults

The seismic environment of active faults in Northern California and the San Francisco Bay Area is characterized by the San Andreas Fault system, which formed due to major forces occurring at the boundary of shifting tectonic plates. This fault system, and its northwest-trending folds and faults, control much of the geologic structure within the northern Coast Ranges. The USGS Working Group on California Earthquake Probabilities estimated that there is a 21 percent chance of the San Andreas Fault experiencing an earthquake of magnitude 6.7 or greater in the next 30 years (USGS, 2003). Additionally, the 1997 Uniform Building Code locates the project area and the greater San Francisco Bay Area within Seismic Risk Zone 4 (International Conference of Building Officials, 1997). Areas within Zone 4 are expected to experience maximum magnitudes and damage in the event of an earthquake.

The two major fault zones in North Sonoma County are the Maacama and Healdsburg-Rogers Creek faults, both of which directly cross the project area. Other faults in the region include the West Napa and Green Valley faults. Table 3.7-3 summarizes the principal faults in the region capable of producing significant groundshaking and surface fault rupture.

Table 3.7-3. Fault Zones in the Project Area

Fault Zone	Distance from Project Area (Approx.)	Regency of Faulting[a]	Historical Seismicity[b]	Maximum Moment Magnitude[c]
San Andreas	8 miles east	Historic	M 7.1: 1989 M 7.8: 1906 M 7.0: 1838 Many < M 6	6.9
Healdsburg/Rodgers Creek	0[d]	Historic	M 6.7: 1898 M 5.6, 5.7: 1969	7.0
Maacama	0[d]	Historic	NA	7.1
West Napa	24 miles southeast	Historic	Active creep[e]	6.9
Hayward	48 miles southeast	Historic - Active	M 6.8: 1868 M 7.0: 1838 Many < M 4.5	6.9

Notes:
[a] Regency of faulting from Jennings, 1994. Historic means displacement has occurred during historic time (last 200 years)
[b] Richter magnitude (M) and year of recent and/or large event
[c] Maximum moment magnitude from Petersen et al. (1996). This is the maximum earthquake moment magnitude, which could occur within the specified fault zone.
[d] Fault crosses project area
[e] Slow fault movement that occurs over time without producing an earthquake
Sources: Sonoma Valley Recycled Water Project Draft EIR

Maacama Fault Zone. The Maacama Fault Zone is the only Alquist-Priolo Earthquake Fault Zone in north of Healdsburg in Sonoma County. The probability of a magnitude 6.6 earthquake on the Maacama Fault within the next 30 years is approximately 70 percent. There are also several thrust faults, all of which are Pre-Quaternary (older than 2 million years), which means that they are unlikely to become active (USGS, 2003). Several small Quaternary and pre-Quaternary faults intersect the Russian River Valley. There is a small late Quaternary fault zone and a small Holocene fault in the Alexander Valley.

Healdsburg-Rogers Creek Fault. The Healdsburg-Rodgers Creek Fault is considered the northern extension of the Hayward Fault and is capable of causing significant groundshaking from Vallejo to north of Healdsburg. It is also considered "active" by the State of California as it has experienced displacement in the last 11,000 years. This fault extends from the Bay portion of Sonoma County through the cities of Santa Rosa and Healdsburg, and is Holocene in age. The maximum credible earthquake magnitude for this fault is 7.0 and is also part of Alquist-Priolo zone. The USGS estimates the probability of a large earthquake (magnitude 6.7 or greater) on the Rodgers Creek fault (when considered together with the Hayward fault) during the period between 2002 and 2032 to be 27 percent; the highest probability for all San Francisco Bay faults (USGS, 2003). The expected groundshaking generated by a seismic event on the Rodgers Creek Fault is anticipated to cause significant damage and interruption of service for transportation (e.g., highways, railroads, and marine facilities) and lifeline (e.g., water supply, communications, and petroleum pipelines) facilities throughout Sonoma County.

Localized Feasibility Study – Reservoir Seismicity

Geological feasibility studies were performed by The Geoservices Group (Geoservices) for five of the proposed reservoir sites, noting each site's geological and seismic conditions and making conclusions and recommendations. The feasibility studies were performed for the Russel/Bucher, Bucher, Becnel, and Jordan sites (A and C). The Russell/Bucher, Bucher, and Becnel sites are all located in the Russian River subarea, whereas the the Jordan A and C sites are located in the Alexander Valley subarea.

The primary geologic unit in this area is of the Franciscan Complex. Relative slope mapping by the CDMG shows localized zones of landsliding in the areas of the Russel/Bucher and Becnel sites, as well as the Bucher site. Active faults are not known to transverse the Russell/Bucher and Becnel sites. Jordan Site A does lie within a zone of northwest trending faults between the Rodgers Creek/Healdsburg and Maacama faults. Jordan Site C also lays within the zone of faults that transverse Site A. Geoservices made the following conclusions: construction of the reservoirs at the Russell/Bucher and Becnel sites appear feasible from a geologic standpoint and, although no active faults are present, the weak bedrock unit in this area may limit the foundational height of a dam embankment. At Jordan Sites A and C, the presence of potentially active or "capable" faults within the dam footprints appears to represent the primary geologic impact to both sites. Geoservices recommended additional evaluation of subsurface fault-rupture hazards for these sites. Like the Russell/Bucher and Becnel sites, the Bucher reservoir site is also located on a weak geologic foundation material.

Figure 3.7-2. Distribution of Slides and Earth Flows

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Pipeline Routes Seismicity

Proposed pipeline routes are located along existing roadways as well as across open land, such as vineyards. The topography of each of the sub-areas contains land that is level, gently sloping, and moderately sloping. Some pipelines would require river/creek crossings.

Seismic groundshaking and liquefaction are the two biggest threats to the proposed pipelines. The northwest-trending faults, which dominant the regional area, are all part of the San Andreas system, and include the San Andreas, Rodgers Creek, Healdsburg, Maacama, Burdell Mountain, Tolay and Chianti faults. These are all considered active or potentially active faults. Faults that are not considered potentially active, but occur in the project vicinity are the Sebastopol, Porter Creek, and Mount Jackson faults. Refer to Figure 3.7-1 for a map of the faults in the proposed project area. The two major faults that run through the proposed project area and its vicinity are the Maacama and Healdsburg/Rodgers Creek. Figures 3.7-3 and 3.7-4 depict earthquake shaking potential in the NSCARP area for these two faults. As shown in Figure 3.7-4, the Healdsburg fault has the highest potential to directly cross a proposed pipeline.

Landslides are another important risk factor; however, this risk would be confined to areas outside of the valley floors.

Proposed pipeline routes throughout the entire project area would be located in areas of moderate to very strong groundshaking potential. Pipelines would also be located in areas of potential liquefaction hazard; however, the areas with the highest potential for liquefaction are in the Alexander Valley sub-area. Refer to Figures 3.7-5 and 3.7-6 for liquefaction potential in the vicinity of the Maacama and Healdsburg faults.

As shown in Figure 3.7-3, the areas of most violent groundshaking potential in the NSCARP area occur in the Alexander Valley subarea. If a strong earthquake were to occur on the Maacama Fault, both the Alexander and Northern Alexander Valley subareas could potentially be hit with strong to very violent shaking severity according to the Mercalli Scale.

Figure 3.7-4 depicts groundshaking levels for the Healdsburg Fault. During a strong earthquake, strong to very strong earthshaking severity could occur in these subareas. However, earthquake scenarios presented in both Figures 3.7-3 and 3.7-4 represent general risks with areas of groundshaking intensity being one unit higher or lower on the Mercalli scale.

Liquefaction potential along the Maacama and Healdsburg Faults are depicted in Figures 3.7-5 and 3.7-6. As with groundshaking severity, the Alexander Valley and Northern Alexander Valley subareas would be prone to the highest levels of liquefaction potential in the NSCARP area, with portions of the Alexander Valley subarea suffering potentially high liquefaction.

3.7.2 Regulatory Setting

This section lists Federal, State and local laws and regulations related to geology, soils, or seismicity in the proposed project area. The local laws are generally incorporated into the city and county general plans and will, therefore, be divided as such. The following discussion outlines the goals, objectives and/or policies of the applicable federal, state, and local regulations:

Federal

Federal Earthquake Hazards Reduction Act

In October 1997, the U.S. Congress passed the Earthquake Hazards Reduction Act to “reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazard reduction program.” To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), refining the description of the agency’s responsibilities, program goals, and objectives.

The NEHRP’s mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; imposed building codes and land use practices; risk reduction through post-quake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. The NEHRPA designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, National Science Foundation, and USGS.

Federal Clean Water Act

The federal Clean Water Act (CWA) regulates the discharge of stormwater from construction sites. Construction activities include clearing, grading, or excavation that results in soil disturbance of at least five acres of total land area. Construction activities that result in soil disturbance of less than five acres require a permit if the construction activity is part of a larger common plan of development. Therefore, the owner of the land where construction would occur is responsible for obtaining coverage under the state-wide General Permit and is required to file a Notice of Intent for each construction activity prior to commencement of construction.

The General Permit requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) and identification of a monitoring program and reporting requirements. Sediment control measures that shall be included in the General Permit from State Water Resources Control Board (SWRCB) Fact Sheet, are as follows:

1. A description of soil stabilization practices. These practices shall be designed to preserve existing vegetation where feasible and to revegetate open areas as soon as feasible after grading or construction. In developing these practices, the discharger shall consider: temporary seeding, permanent seeding, mulching, sod stabilization, vegetation buffer strips, protection of trees, or other soil stabilization practices. At a minimum, the operator must implement these practices on all disturbed areas during the rainy season;

Figure 3.7-3. Maacama Fault Earthquake Scenario

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Figure 3.7-4. Healdsburg Fault Earthquake Scenario

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Figure 3.7-5. Maacama Fault Liquefaction Potential

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Figure 3.7-6. Healdsburg Fault Liquefaction Potential

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2. A description or illustration of control practices which, to the extent feasible, will prevent a net increase of sediment load in stormwater discharge. In developing control practices, the discharger shall consider a full range of erosion and sediment controls such as detention basins, straw bale dikes, silt fences, earth dikes, brush barriers, velocity dissipation devices, drainage swales, check dams, subsurface drain, pipe slope drain, level spreaders, storm drain inlet protection, rock outlet protection, sediment traps, temporary sediment basins, or other controls. At a minimum, sandbag dikes, silt fences, straw bale dikes, or equivalent practices are required for all significant sideslope and downslope boundaries of the construction area. The discharger must consider site-specific and seasonal conditions when designing the control practices;

3. Control practices to reduce the tracking of sediment onto public or private roads. These public and private roads shall be inspected and cleaned as necessary; and,

4. Control practices to reduce wind erosion.

State of California

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act, signed into law December 1972, requires the delineation of zones along active, potentially active, and well-defined faults. The purpose of the Alquist-Priolo Act is to regulate development on or near active fault traces to reduce the hazard of fault rupture. These fault-rupture hazard zones occur in the Alexander and Northern Alexander sub-areas. Refer to “Area Faults” and “Geologic Conditions in the Propose Project Area – Faults”, for a more detailed discussion of faults in the proposed project area.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act enacted by the California legislature in 1990, was developed to protect the public from the effects of strong groundshaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes. This Act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a seismic hazard zone, a geotechnical investigation of the site has to be conducted and appropriate mitigation measures incorporated into the project design.

California Building Code

For excavation and grading activities, Title 8 of the California Code of Regulations (CCR) and Occupational Safety and Health Act (OSHA) requirements state that excavations must be shored or otherwise stabilized to preclude slope failure during construction.

The California Building Code (CBC) is another name for the body of regulations known as the CCR, Title 24, Part 2, which is a portion of the California Building Standards Code. Title 24 is assigned to the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable.

Published by the International Conference of Building Officials, the Uniform Building Code (UBC) is a widely adopted model building code in the United States. The CBC incorporates by reference the UBC with necessary California amendments. About one-third of the text within the CBC has been tailored for California earthquake conditions.

In addition, the UBC (Section A33 - Excavation and Grading) also requires that shoring of trenches or other structural integrity measures are implemented, including erosion control measures.

State Water Resources Control Board -- National Pollution Discharge Elimination System

The State Water Resources Control Board (SWRCB) has adopted a NPDES general permit for Storm Water Discharges Associated with Construction Activity (State Permit) that requires every construction project greater than one acre to submit a Notice of Intent (NOI) for coverage, and prepare and implement a Storm Water Pollution Prevention Plan (SWPPP).

Under the conditions of the state permit, the project site would be required to eliminate or reduce non-storm water discharges to U.S. waters, develop and implement a SWPPP for the project construction activities, and perform inspections of the storm water pollution prevention measures and control practices to ensure conformance with the site SWPPP. The state permit prohibits the discharge of materials other than storm water discharges, and prohibits all discharges that contain a hazardous substance in excess of reportable quantities established at 40 Code of Federal Regulations (CFR) 117.3 or 40 CFR 302.4.

Division of Safety of Dams

Since 1929, the State of California has supervised the construction and operation of dams to prevent failure to safeguard life and protect property. The California Department of Water Resources' Division of Safety of Dams (DSOD) supervises the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. The DSOD has jurisdiction over all nonfederal dams in the State that are 25 feet or higher (regardless of storage capacity) and dams with a storage capacity of 50 af of water or greater (regardless of height). Dams six feet or less in height (regardless of storage capacity), or dams with a storage capacity of 15 acre-feet or less (regardless of height), are not under the Division's jurisdiction (California Water Code, Division 3).

When reviewing permit applications the DSOD evaluates the safety of dams and reservoirs by assessing the potential for seepage, earth movement, and other conditions that may occur in the vicinity of a dam or reservoir. The Division requires that data concerning subsoil, foundation conditions, availability of construction materials, and geologic hazards be gathered to review the design, construction, and operation of dams and reservoirs. Investigations usually include exploratory pits, trenches, drilling, coring, geophysical surveys, tests to determine leakage rates, and physical tests to measure properties of foundation materials. Staff at the DSOD performs an independent evaluation of the dam engineer's design to ensure that the design meets or exceeds required standards. Special conditions may be attached to the DSOD permit approval, and design and construction plans may be modified by the Division at any time after approval to ensure safety.

During the construction or repair of any dam or reservoir, the DSOD is required to make continuous and periodic inspections to verify that construction is proceeding in accordance with approved plans[6]. No foundations or abutments may be covered until the Division's field engineer has inspected and approved them. The DSOD permit approval may be revoked whenever the dam or reservoir constitutes a danger to life and property.

A discussion of historical dam failure, dam surveillance and monitoring, and evaluation of dam inundation are provided in Section 3.13, Public Health and Safety.

California Surface Mining and Reclamation Act

Under the California Surface Mining and Reclamation Act of 1975, the State Geologist classifies land in the State for its mineral resource potential according to various Mineral Resource Zone categories that reflect varying degrees of mineral potential. Within the NSCARP area, there are mineral resources identified in the Resource Conservation Element of the Sonoma County General Plan as Mineral Resource Deposits subject to resource conservation policy requirements under the MRZ-2 classification. The MRZ-2 classification includes areas where geologic data indicate significant measured, indicated, or inferred resources.

The largest areas of such designations within the proposed project area consist of aggregate deposits along the Russian River in the Alexander Valley and south of Healdsburg.

Local

Sonoma County Aggregate Resources Management Plan

Sonoma County has adopted the Aggregate Resources Management (ARM) Plan, a plan for obtaining future supplies of aggregate material. This plan serves as the state-mandated mineral management policy for the County and is intended to accomplish the mandated purposes. During the process of adoption of the plan, the County considered the aggregate resource areas subsequently classified as MRZ-2 by the State Geologist and transmitted by the Board of Supervisors in compliance with the Act in February, 1985. Portions of land along the Russian River are classified as MRZ-2. The Inmam Quarry is located approximately two miles west of Healdsburg and 1,000 feet west of Mill Creek Road.

Refer to Section 3.9, Table 3.9.3 for a list of applicable goals, objectives, and policies of the Sonoma County General Plan regarding geology and soils.

3.7.3 CEQA Thresholds of Significance Criteria

The evaluation criteria for Geology, Soils, and Seismicity are presented below. These criteria are drawn from CEQA requirements. According to the CEQA Guidelines, exposure of people or structures to major geologic hazards is considered a significant impact. Potential geologic

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6 Under the police power of the State, representatives of the Division of Safety of Dams may enter private property to make investigations or inspections.

hazards within the proposed project area include slope instability, strong groundshaking, ground rupture, liquefaction, soils with a high potential for shrinking/swelling, corrosive soils, and induced seismic activity.

Table 3.7-4. CEQA Evaluation Criteria/Thresholds of Significance

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will the NSCARP be located within an area of unstable slope conditions?	Geotechnical assessment of landslide risk potential	Location of facilities in area mapped as *Mostly Landslide* or *Many Landslides*	The rating takes into consideration the prevalence of mapped landslides in the area. Landslides and other slope failure could occur in areas where landslides are common. Areas with *Few Landslides* or *Flat Land* are expected to have stable slope conditions CEQA Guidelines Appendix G, Checklist Item VI (c).
2. Will the NSCARP be subject to ground rupture due to location near a surface trace of an active fault?	Location of facilities within an Alquist-Priolo Earthquake Fault Zone	Any portion of facilities within zone	Earthquake fault zones are established under the Alquist-Priolo Earthquake Fault Zoning Act by the CDMG, now the CGS, to regulate development near active faults to mitigate the hazard of surface rupture. The Act applies only to structures for human occupancy but the zones accurately delineate areas at greatest risk for surface fault rupture. CEQA Guidelines Appendix G, Checklist Item VI (a)(i)
3. Will the NSCARP be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake?	Geotechnical assessment of potential for liquefaction or more detailed mapping, where available	A rating of High for liquefaction for program facilities except irrigation pipes	Certain soil types, especially fine sandy soils, underlain by shallow groundwater, are prone to liquefaction. The CDMG has identified areas where soil properties are highly susceptible to liquefaction (CDMG 1997, *Special Publication 117*.). Program facilities in these areas would be vulnerable to damage from liquefaction. CEQA Guidelines Appendix G, Checklist Item VI (c)
4. Will the NSCARP induce seismicity?	Induced groundshaking intensity	Groundshaking effects of Modified Mercalli[1] intensity V or greater increasing in frequency by 20% or more	Earthquakes that produce groundshaking intensity of Modified Mercalli IV (generally corresponds to a magnitude 3 earthquake within an epicentral distance of several miles) are not generally associated with damage to people or property. CEQA defines damage to people or property as a significant effect.

Table 3.7-4. (Continued)

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
5. Will earthquake-induced strong groundshaking damage NSCARP facilities?	Structural and geotechnical design and construction not in conformance with requirements of regulatory agencies and applicable building codes (refer to text).	Construction not in conformance with requirements of the DSOD or applicable building codes.	Uniform Building Code (UBC 1997) as amended locally and DSOD regulations. CEQA Guidelines Appendix G, Checklist Item VI (a)(ii and iii)
6. Will construction of the NSCARP cause off-site water-related erosion?	Construction activities not in compliance with requirements of the program National Pollutant Discharge Elimination System Permit (NPDES), Division of Safety of Dams regulations, or building and grading codes.	Construction not in compliance with NPDES, DSOD, or building and grading codes.	Clean Water Act regulations, CDMG regulations, and local building or grading ordinances (refer to text).
7. Will NSCARP be exposed to damage due to expansive soils?	Shrink-swell potential as rated in Sonoma County Soil Survey (Soil Conservation Service 1972)	Any construction inconsistent with standard engineering practices	The USDA Soil Conservation Service (SCS) indicates that: "If the shrink-swell potential is rated moderate to very high, shrinking and swelling can damage buildings, roads, and other structures." CEQA Guidelines Appendix G, Checklist Item VI (d)

Table 3.7-4. (Continued)

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
8. Will NSCARP be exposed to damage due to construction on corrosive soils?	Corrosion potential as rated in Sonoma County Soil Survey (SCS 1972)	Any construction inconsistent with standard engineering practices	The Natural Resources Conservation Service (formerly SCS) indicates that soils with High corrosion can damage uncoated steel and concrete by chemical actions that dissolve and weaken the material.
9. Will the NSCARP be an incompatible land use type in the MRZ-2 classification, designated quarry area, or in The Geysers?	a. Acres of MRZ-2 land developed in incompatible uses b. Acres of quarry site designated by the ARM plan developed in incompatible uses.	Greater than 0 acres of land Greater than 0 acres of land	Sonoma County General Plan and the Mineral Land Classification of the Division of Mines and Geology (1989). CEQA Guidelines Appendix G, Checklist Item X (a) Sonoma County Aggregate Resources Management (ARM) Plan (1994). CEQA Guidelines Appendix G, Checklist Item X (a)

3.7.4 Methodology

Geological, soil, and seismic impacts were evaluated by reviewing maps showing the various potential hazards in the NACARP area, and comparing these maps to the potential location of NSCARP components. Components associated with non-specific locations within a general area were evaluated by identifying higher and lower risk areas within the general areas, estimating the percentages of high and low risk land, and comparing the hazards or risks to the significance thresholds discussed in the previous section. The Geologic Feasibility Study prepared by Geoservices was also used in analyzing potential impacts.

3.7.5 Alternatives Analysis

Alternative 1 – No Project

The "No Action" Alternative means that the SCWA would not implement a regional water conveyance and storage project to serve recycled water to the NSCARP area. As no project construction or operational activities would occur, there would be no impacts from geologic or soils hazards to the project area with implementation of this alternative.

Alternative 2 – Entire NSCARP

Impact GEO-1: The NSCARP project potentially could be located within an area of unstable slope conditions.

Discussion: Unstable slope conditions are generally associated with steep slopes and areas of previously mapped slides. According to Figure 3.7-2, the proposed project includes areas mapped as *Flatland* or *Few Landslides;* however, there are also areas of *Mostly Landslides*, which are present in all four valley sub-areas. Construction and implementation of the NSCARP pipeline, reservoirs, and pumping stations could result in substantial grading and create slope instability. Permanent placement of project components, such as pipelines and reservoirs, could also occur in areas of potentially unstable slopes. In particular, the western portions of the Dry Creek Valley and Russian River Valley sub-areas contain areas mapped as *Mostly Landslides* where proposed reservoirs would be located. This is considered a significant but mitigable impact.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 1

Mitigation Measure GEO-1: The following recommendation and mitigation measures shall be incorporated, under the direction of the SCWA, into the project design specifications to reduce unstable slope conditions per Geoservices' Geologic Feasibility Study.

A. Where steep or unstable slopes are encountered, implementation of Best Management Practices (BMPs) and other standard engineering practices shall be used. These include the keying-in of engineered slopes, use of retaining walls, slope stability monitoring, and dewatering systems. Appropriate reservoir siting criteria would ensure that storage sites would avoid mapped landslide areas. Standard slope stabilization measures, as approved by the DSOD, shall be implemented to provide adequate dam and reservoir foundation;

B. Per Geoservices' Geologic Feasibility Study, options to mitigate the impact of debris slides may include removal of the weathered, debris-slide prone surficial soil zone during reservoir grading; construction of debris catchment measures such as debris fences, a bench/perimeter road to catch debris; or debris basins; and,

C. Consistent with General Plan Policy PS-1f, a geologic study report shall be prepared under direction of the SCWA for each reservoir site prior to construction. Each report shall describe the hazards and include mitigation measures to reduce risks to acceptable levels. The design specifications for each reservoir site shall provide an engineer's or geologist's certification that risks have been mitigated to an acceptable level. To assess whether large landslides are present in dam and reservoir areas beyond those already evaluated, Geoservices recommends further evaluation by performing subsurface exploration to determine if in-place bedrock is present as part of each geologic study report.

Impact after Mitigation: Less than Significant. After incorporation of BMPs and standard engineering practices, including slope stabilization measures, the amount of landsliding at reservoir sites and pipelines located in hilly terrain would be reduced to less than significant levels with implementation of Mitigation Measure GEO-1.

Impact GEO-2: NSCARP components may be subject to ground rupture due to location near a surface trace of an active fault as measured by location of facilities within an Alquist-Priolo Earthquake Fault Zone.

Discussion: Two active faults cut through the proposed project area and vicinity (Maacama and Healdsburg/Rodgers Creek faults). Figures 3.7-3 and 3.7-4 depicts the locations of these faults.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 2

Mitigation Measure GEO-2. NSCARP facilities shall be sited as to avoid Alquist-Priolo buffer zones, as determined by the CGS, as much as feasible. Per Geoservice's conclusions, the feasibility of construction of DSOD jurisdictional-size dams in reservoir locations will require additional evaluation of the surface fault rupture hazards, as proposed reservoirs located in the eastern portions of the Northern Alexander and Alexander Valley sub-areas would be located in close proximity to the Maacama Fault line. A major earthquake would subject the proposed recycled water pipeline alignments to ground motion and under extreme conditions, could potentially cause material failure or piping connection failure leading to rupture and release of water; however, the pipeline and associated structures would be designed to accommodate site-specific ground motions greater than those anticipated for this region. Measures to be implemented would include:

- Engineering designs, construction practices and materials such as flexible pipes, shall be implemented in a manner that would be resistant to damage from rupture; and,
- Performing a limited number of backhoe test pits/trenches across the trace of faults, to observe the units offset by the fault rupture surface and to identify the youngest geologic units offset by the fault.

Impact after Mitigation: Less than Significant. The measures listed above would reduce potentially significant impacts related to ground rupture of fault lines to the extent feasible and damage to NSCARP facilities would be localized and readily repaired. Standard geotechnical and structural design criteria used to reduce excessive earthquake response and potential damage or collapse would ensure that earthquake ground shaking impacts remain less than significant. Furthermore, as discussed in Impact HWQ-9 of Section 3.8, Hydrology, the quantity of water that may be released from a pipeline rupture would be limited by the closure of isolation valves on both sides within minutes of detected pressure drop. Additional design measures (see Mitigation Measure HWQ-9) will further minimize potential impacts. As such, impacts would be less than significant with implementation of Mitigation Measure GEO-2.

Impact GEO-3: NSCARP components will be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake, as measured by geotechnical assessments or detailed mapping.

Discussion: Figures 3.7-5 and 3.7-6 depict liquefaction hazard potential in relation to the proposed project sub-areas. The liquefaction potential in portions of the Alexander Valley sub-area is high, with substantial areas of the Northern Alexander and Alexander Valley sub-areas having moderate liquefaction hazard potential. The eastern portion of the Russian River Valley sub-area between Eastside Road and U.S. Highway 101, as well as along the Russian River itself, may also experience moderately low to moderate liquefaction hazard potential.

Agricultural irrigation improvements include pumping station housings and irrigation pipelines. Pipelines installed in low-lying areas along rivers and creek crossings that are underlain by geologically young sands and gravels, where shallow groundwater is present, would be vulnerable to damage by liquefaction. Liquefaction can cause pipes to bend, crack and/or rupture, and may disrupt the alignment of pipes. However, damage to irrigation pipelines would be easily repaired. Actual liquefaction hazards can only be determined through a site-specific geologic investigation at the design-level.

With regards to reservoirs and pumping station components, the latter would generally be located off the valley floor areas where liquefaction hazard risk is the highest (e.g. portions of the Alexander Valley sub-area). No reservoirs are proposed in locations of high liquefaction potential. Although impacts to reservoirs and pumping stations would be less than significant, liquefaction risks to areas of proposed pipeline would be potentially significant; therefore, mitigation would be required for pipelines through site-specific geotechnical investigation.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 3

Mitigation Measure GEO-3: Prior to the approval of construction plans for the proposed project components, design-level geotechnical investigations, including collection of site specific subsurface data, shall be completed by a qualified geotechnical engineer. The geotechnical evaluations shall include identification of density profiles, estimation of approximate maximum shallow groundwater levels, and development of site-specific design criteria to mitigate potential risks.

Impact after Mitigation: Less than Significant. With implementation of Mitigation Measure GEO-3, impacts due to liquefaction would be less than significant.

Impact GEO-4: NSCARP has a low potential to induce seismicity as measured by induced groundshaking intensity.

Discussion: None of the activities or effects associated with the NSCARP project would involve deep injection of water and thus would not induce seismic activity. Furthermore, as covered previously, reservoir-induced seismicity research, which includes studies of thousands of case histories, indicates that only a few, very large, reservoirs have induced large earthquakes (greater than magnitude 5) due to the weight of the stored water. However, a reservoir water depth of at least 260 feet is required to induce seismicity, much deeper than any reservoirs proposed for the NSCARP. Induced earthquakes large enough to be damaging have never been documented to occur in reservoirs with lesser water depths.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 4

Mitigation Measure: No mitigation is needed.

Impact GEO-5: NSCARP facilities could potentially be damaged by earthquake-induced groundshaking.

Discussion: NSCARP facilities would be fairly insensitive to seismic groundshaking. Building codes are not applicable to design and construction of irrigation facilities, but construction would conform to standard engineering practices. It is possible that minor damage to irrigation equipment could occur during an earthquake. Repairs would be of the type associated with regular maintenance activities (e.g. replacement of broken couplings) and could be readily implemented.

Reservoirs

Proposed reservoirs in the Northern Alexander and Alexander Valley sub-areas are located in close proximity to the Maacama Fault. However, strong groundshaking would not likely cause significant damage to the reservoir component of the NSCARP as long as dams are constructed in conformance with the requirements of the DSOD.

Groundshaking from a significant earthquake could either cause an immediate embankment failure during an earthquake, or cause a leak that could eventually lead to embankment failure. Failure of the embankments and the subsequent dewatering of a storage reservoir could expose people and property to the hazards of downstream flooding. The water retention embankments at the proposed storage reservoirs would be properly engineered, constructed, and periodically inspected; therefore, groundshaking impacts would be considered less than significant. The reservoirs would be designed to withstand the effects of expected seismic events, the secondary ground failures associated with groundshaking, unstable slope conditions, or damage from corrosive or expansive soils. As such, impacts from seismic groundshaking causing localized or catastrophic dam failure would remain less than significant.

Pipelines

Standard geotechnical and structural design criteria used to reduce excessive groundshaking damage or pipeline collapse would ensure that earthquake groundshaking impacts remain less than significant. Additionally, applicable engineering codes and grading ordinances would ensure that strong groundshaking during an earthquake would not significantly impact pipelines to the extent feasible, except in cases where pipelines directly cross an active fault. An earthquake on either the Healdsburg/Rodgers Creek or Maacama faults could rupture pipelines crossing these faults. The average rate of recycled water flow in a completely severed agricultural irrigation pipeline would be approximately four cfs. However, design measures such as automated isolation valves (on one or both sides of the pipeline crossing) would be incorporated into the project to prevent significant water flows in the event of a rupture. This would be accomplished through an automatic shut-off of valves within two minutes of a detected pressure drop. The quantity of water released prior to isolation valve closure would be less than 55,000 gallons, or two minutes of flow at 80 million gallons per day (IRWP, 2003). Design measures incorporated in the project would make potential damage to NSCARP facilities in the event of an earthquake less than significant.

Pump Stations

Groundshaking at the pump stations could cause structural damage to the facility equipment and expose workers to injury from building structure damage from toppling machinery, and equipment, or fall hazards. Damage to essential equipment and electrical supply could result in temporary cessation of facility operations. Although earthquakes are unavoidable, the hazards associated with manmade structures can be minimized through appropriate design and engineering. Equipment, structural foundations and pump station buildings would be designed to accommodate anticipated ground motion for the site and comply with the CBC. Therefore, impacts associated with the effects of earthquake groundshaking would be reduced to less-than-significant levels.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 5

Mitigation Measure: No mitigation is needed.

Impact GEO-6: NSCARP construction has a low probability to cause off-site water-related erosion.

Discussion: Construction of agricultural irrigation and reservoir systems for the NSCARP project could alter drainage patterns. Construction of facilities would conform to requirements of the NPDES and would be governed by a SWPPP, which would contain an erosion and sediment control plan. The implementation of BMPs would also reduce impacts from runoff during construction and after.

In the event of a pipeline rupture during an earthquake, the average rate of flow from a ruptured pipeline would be approximately four cfs. With isolation valve closure, the output could be expected to be less than 55,000 gallons (see Impact GEO-5 for further discussion). With these design features incorporated into the project (as prescribed by Mitigation Measure GEO-2A), the output of flow in such a case would not be expected to create catastrophic off-site erosion. Significant site erosion is highly unlikely as the probability of a severe seismic event is very low. As such, impacts related to pipeline rupture are considered to be less than significant. Additionally, the reservoir component of the NSCARP would not create significant erosion potential as long as dams are constructed in conformance with DSOD requirements.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 6

Mitigation Measure: No mitigation is needed.

Impact GEO-7: NSCARP components may be vulnerable to damage due to expansive or corrosive soils.

Discussion: Any expansive soils underneath the Proposed Project could cause material failure or piping connection failure leading to rupture and release of water. Per Mitigation Measure GEO-4, the SWCA would conduct additional geotechnical investigations where specific alignment areas are planned, including expansive soil investigations. If expansive soils are found, SWCA would follow the recommendations made as a result of the investigations. Mitigation Measure GEO-4 would reduce impacts associated with expansive soil-related pipeline rupture to less than significant levels.

Because expansive and corrosive soils are common throughout the project area and vicinity, the NSCARP project would incorporate standard engineering methods for expansive and corrosive soils. For example, the presence of expansive soils would include the use of stabilization measures, removal of expansive soils, and other actions to mitigate for the presence of these soils. Non-corrodible materials such as PVC or active cathodic protection systems would mitigate for the presence of corrosive soils. Implementation of these measures would reduce the impact of to a level that is less than significant.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criteria: 7, 8

Mitigation Measure GEO-7: Under the direction of the SCWA, a qualified geotechnical engineer shall conduct site specific geotechnical investigations in the areas where pipelines and pumping stations would be sited prior to construction. The investigations shall identify appropriate engineering considerations as recommended by a certified engineering geologist or registered geotechnical engineer for planned facilities, including engineering considerations to mitigate the effects of expansive and corrosive soils. Recommendations made as a result of these investigations to protect pipelines and pumping stations from expansive and corrosive soils shall be incorporated into project design specifications.

Impact after Mitigation: Less than Significant. With implementation of Mitigation Measure GEO-7, impacts from expansive or corrosive soils would be less than significant.

Impact GEO-8: NSCARP components may be an incompatible land use type in the MRZ-2 classification or designated quarry area.

Discussion: Portions of the Russian River within the Northern Alexander, Alexander and Russian River Valley sub-areas contain MRZ-2 zones parallel to the river course. It is highly likely the pipeline component of the NSCARP project will transverse land classified as MRZ-2. Primarily, this would occur in areas where the pipeline crosses the river; however, the route of the proposed pipeline river crossings would be aligned with existing bridges where they exist. Otherwise, pipeline crossing would pass under the river with the use of jack-and-bore technique or horizontal directional drilling.

The Inman Quarry is located in the vicinity of Mill Creek Road, two miles west of Healdsburg. Reservoirs are proposed in the general vicinity of the quarry; however, they would not result in the filling-in of the quarry.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 9

Mitigation Measure GEO-8: The SCWA shall ensure proposed pipelines be sited so as to avoid MRZ-2 zones and achieve compatible land use as much as feasible. Recommendations for siting pipelines shall be incorporated into design specifications prior to construction.

Impact after Mitigation: Less than Significant. The majority of the proposed pipelines exist outside of MRZ-2 zones. In areas where a proposed pipeline would cross the Russian River and transverse MRZ-2 zones, these zones would be impacted by the pipeline crossings, which would result in a land-use incompatibility. However, this residual impact would be temporary in nature and only affect MRZ-2 zones during the construction period. Pipeline installation by the jack-and-bore and directional drilling methods would require approximately one or two weeks per waterway crossing. No mining would be allowed within the permanent construction easement. This impact would be considered less than significant due to the small area affected.

Impact GEO-9: NSCARP components have a low probability to adversely affect a hot spring, or other unique geological feature.

Discussion: There are no hot springs or unique geological features identified within the NSCARP project area; therefore, there would be no impact.

Impact Category: No Impact

CEQA Threshold of Significance Criterion: 10

Mitigation Measure: No mitigation is needed.

Alternative 3 – Alexander Valley-Jordan Reservoir Subset

This alternative represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C reservoirs. This alternative would serve a smaller service area commensurate with the amount of potential storage capacity at the two proposed reservoir sites and potential summer recycled water supplies available from the ALWSZ treatment plant. As such, impacts from geologic and soils hazards would be similar to Alternative 2, but smaller in scale. Mitigation measures implemented for Alternative 2 to reduce significant impacts to less than significant impacts would also be applied to Alternative 3.

Alternative 4 – Russian River-Westside Subset

This alternative represents a scaled-down version of the Russian River Valley subarea. It limits storage reservoir development to the Russel-Bucher, Bucher, and Becnel #2 reservoir sites and utilizes the existing Gallo Twin Valley Reservoir. This alternative involves serving a smaller service area than the Russian River Valley subarea commensurate with the potential storage capacity that has been identified in the hills west of Westside Road, and potential summer recycled water supplies available from the ALWSZ. As such, impacts from geologic and soils hazards would be similar to Alternative 2, but smaller in scale. Mitigation measures implemented for Alternative 2 to reduce significant impacts to less than significant impacts would also be applied to Alternative 4.

3.8 HYDROLOGY AND WATER QUALITY

This section describes the hydrology and surface water characteristics at the locations of the various NSCARP components. Potential environmental impacts regarding hydrology and water quality are evaluated for these components. Appropriate mitigation measures are proposed for each potentially significant environmental impact. Other sections of this EIR have been referenced as appropriate if impacts related to hydrology and water quality could result in impacts to other resource areas.

3.8.1 Physical Setting

Hydrology is defined as the "study of water in all its forms and from all its origins to all its destinations on earth." The hydrologic cycle is the general course through which water moves as it is transpired by plant metabolism; evaporates from the surface of water bodies, such as oceans, lakes, and rivers; collects by condensation as clouds and returns to earth as precipitation. Precipitation either forms surface runoff or infiltrates to sub-surface bodies of water, or aquifers as groundwater.

Groundwater

This section provides a summary of the basic concepts of groundwater hydrology. The material has been summarized from the Evaluation of Groundwater Resources: Sonoma County (California State Department of Water Resources [DWR Bulletin 118] 2003) and the SCWA 2005 Urban Water Management Plan and focuses on groundwater resources within the NSCARP area.

Groundwater is a component of the hydrologic cycle, which describes locations where water may occur and the processes by which it moves or is transformed to a different phase. Water or one of its forms—water vapor and ice—can be found at the earth's surface, in the atmosphere, or beneath the earth's surface. Water evaporates from a surface water source such as an ocean, lake, or through transpiration from plants. The water vapor may move over the land and condense to form clouds, allowing the water to return to the earth's surface as precipitation (rain or snow). Most of the rain and snowmelt will either become overland flow in channels or will infiltrate into the subsurface. Some of the infiltrated water will be transpired by plants and returned to the atmosphere, while some will cling to particles surrounding the pore spaces in the subsurface, remaining in the vadose (unsaturated) zone. The rest of the infiltrated water will move gradually under the influence of gravity into the saturated zone of the subsurface, becoming groundwater. From here, groundwater will flow toward points of discharge such as rivers, lakes, or the ocean to begin the cycle anew. This flow from recharge areas to discharge areas describes the groundwater portion of the hydrologic cycle.

Groundwater is the water occurring beneath the earth's surface that completely fills (saturates) the void space of rocks or sediment. Given that all rock has some open space (voids), groundwater can be found underlying nearly any location in the State. Several key properties help determine whether the subsurface environment will provide a significant, usable groundwater resource. Most of California's groundwater occurs in material deposited by streams, called alluvium. Alluvium consists of coarse deposits, such as sand and gravel, and finer-grained deposits such as clay and silt. The coarse and fine materials are usually coalesced in thin lenses and beds in an alluvial environment. In this environment, coarse materials such as sand and gravel deposits usually provide the best source of water and are termed aquifers; whereas, the finer-grained clay and silt deposits are relatively poor sources of water and are referred to as aquitards. California's groundwater basins usually include one or a series of alluvial aquifers with intermingled aquitards. Less frequently, groundwater basins include aquifers composed of unconsolidated marine sediments that have been flushed by fresh water.

Regional Groundwater

Groundwater recharge in the study area generally occurs in upland areas adjacent to groundwater basins. The primary sources of recharge are precipitation and stream seepage. Recharge occurs wherever permeable materials are near the surface and connect with the principal groundwater body, and surface slopes are gentle enough to limit the amount of precipitation that becomes surface runoff.

Groundwater discharge occurs mostly along the major trunk streams. In these areas, groundwater discharges as underflow to the streams or adjacent low-lying areas such as the Laguna de Santa Rosa. This water then flows as surface water toward the Russian River. Groundwater is also lost through evapotranspiration in the extensive marsh areas of the Laguna de Santa Rosa. Water extracted from wells also contributes to removal of groundwater from the basins.

In areas that have unconfined groundwater, the water table surface will generally follow the topography such that groundwater elevations are highest at topographic high areas and low in the lower topographic areas. In areas of confined groundwater the level to which groundwater will rise in a well under hydrostatic pressure may or may not mirror the local topography.

There is a potential increase for groundwater levels throughout the groundwater basins. Rainfall has a direct impact on groundwater levels in the project area. Rainfall either lands on impermeable surfaces, or on permeable surfaces at a faster rate than can be absorbed, and becomes runoff or surface water, or it lands on unsaturated permeable soils and is absorbed. Once saturated, permeable soils essentially become impermeable surfaces. Highly permeable areas that have the ability to absorb large amounts of water are called recharging areas. Water that infiltrates permeable materials may eventually reach a zone of saturation and become groundwater. As groundwater levels are depleted (either naturally through springs, or mechanically through wells), infiltration is necessary to recharge or maintain groundwater levels. Groundwater levels will drop if the rate of withdrawal is greater than the rate of infiltration.

The same characteristics that allow some soils to absorb water quickly (permeable soils) also makes these materials attractive locations for removing water. Permeable soils tend to consist of coarse materials with large open or pore spaces. The larger the pore space, the faster water can move through the material. Nearly all of the geologic formations of Sonoma County can yield water to wells. Well-yields range from 3,000 gallons per minute (gpm) in wells located in coarse-grained alluvium, to less than one gpm in wells located in consolidated rock. Wells with high yields usually produce water of good to excellent quality; those with lower yields may produce water containing significant quantities of undesirable mineral constituents. In general, water-yielding formations in Sonoma County are stream channel deposits, alluvium, alluvial fan deposits, and the Merced Formation. Formations that generally produce only low yields of groundwater are basin deposits, such as the Glen Ellen Formation. The only non water-yielding formation in the project area is the Franciscan complex. Please refer to Section 3.7 "Geology and Soils" for a discussion of the geology of the project area.

Groundwater Areas

NSCARP is located in various groundwater areas including designated groundwater basins, contiguous and detached groundwater areas, and non-water-bearing areas that are not within defined groundwater basins.

A groundwater basin is defined as an alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and a definable bottom. Lateral boundaries are features that significantly impede groundwater flow such as rock or sediments with very low permeability or a geologic structure such as a fault. Bottom boundaries would include rock or sediments of very low permeability if no aquifers occur below those sediments within the basin.

There are 11 separate groundwater basins in Sonoma County as portrayed in DWR Bulletin 118, which provides summaries of groundwater conditions throughout California. See Figure 3.8-1. These basins, formed over geologic time under various conditions, vary in water availability, water quality, and recharge potential. In some cases, the groundwater basins have been divided into groundwater subbasins that have different hydrogeologic characteristics.

Of the 11 separate groundwater basins, the NSCARP area is within the Alexander Valley Groundwater Basins (DWR number 1-54), the Santa Rosa Valley Groundwater Basin (DWR number 1-55), and the Lower Russian River Valley Groundwater Basin. See Figure 3.8-1. The following discussion and basin descriptions for these three basins are summarized from Bulletin 118 – Update 2003 and on-line more detailed Bulletin 118 basin descriptions (DWR), 2003) which include the most current compilations of regional groundwater information.

<u>Alexander Valley Groundwater Basin</u>

The Alexander Valley Groundwater Basin is the second largest groundwater basin in the NSCARP area. The groundwater basin occupies a structural depression in the Coast Ranges geomorphic province in Sonoma County and is drained by the Russian River. The groundwater basin is divided into two subbasins, the Alexander Area Subbasin, and the Cloverdale Area Subbasin.

Alexander Area Subbasin

The northern boundary of the Alexander Area Subbasin is approximately two miles south of Asti and the southern boundary of the basin is approximately five miles southeast of Jimtown. The unconsolidated alluvial sediments of the subbasin are bounded by low hills to the south that contain water-bearing sediments.

The primary water-yielding formations of the Alexander Area Subbasin are alluvium and the Glen Ellen Formation. The recent alluvium generally occurs as flood plains and active channels of the Russian River. Older alluvium, Pleistocene to Holocene in age, occurs as alluvial fans, stream terraces, and older stream channels. Alluvial deposits along the Russian River consist of poorly sorted gravels and sands interbedded with clay and silt floodplain deposits (DWR, 2001). Well yields vary from 50 to 500 gpm with the higher yielding wells occurring near the channel of the Russian River where the sediments are coarser grained. The maximum thickness of the alluvium is 150 feet (DWR, 2001).

The Glen Ellen Formation outcrops along the subbasin margins and forms the low-lying hills in the vicinity of Jimtown in the southerly portion of the subbasin. The Glen Ellen formation consists of poorly sorted gravel, sand, and silt and clay and occurs as deformed continental deposits that interfinger with the Sonoma Volcanics (DWR, 2001). Based on drillers' logs, the thickness of the formation in the Alexander Area Subbasin is variable, occurring as shallow as 10 to 60 feet below the valley sediments and extending as deep as 1,000 feet (DWR, 2001). Wells completed in the Glen Ellen Formation in the southern part of the Subbasin yield up to 120 gpm with specific yields varying from three to seven percent.

To a lesser extent, there are wells located in the Sonoma Volcanics along the margins of the sub-basin. The best wells in the Sonoma Volcanics occur in coarse tuff or volcanic ash and yield 10 to 50 gpm.

Groundwater in this sub-basin is generally moderately hard to hard and contains bicarbonate, which are the primary ions that contribute to alkalinity in the water. TDS ranged from 130 to 444 mg/l, based on data from 16 wells sampled between 1957 and 1980. The most common water quality problems in this sub-basin are from iron and manganese or hydrogen sulfide (Hauge and Mitchell 1983).

Figure 3.8-1. Groundwater Basins

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Cloverdale Area Subbasin

The Cloverdale Subbasin is a sub-basin of the Alexander Valley Groundwater Basin and occupies a structural depression in the Costal Ranges north of the San Francisco Bay. The Cloverdale valley floor is locally bounded by low hills consisting of unconsolidated water-yielding sediments. The basin boundary extends from Alderglen Springs and Preston in the north to about one mile south of Asti. The southern boundary is noted by a reduced section of water-bearing materials between Cloverdale and Alexander valleys. The Russian River flows south along the entire length of the basin. It is joined by Big Sulfur Creek, a principal tributary, at the north end of Cloverdale Valley. Precipitation in the sub-basin ranges from 40 to 44 inches over the entire basin.

The principal source of groundwater in the Cloverdale area sub-basin is Holocene-age alluvium and, to a much lesser extent, Jura-Cretaceous age Franciscan Complex (DWR, 1983). Alluvium, consisting of unconsolidated sand, silt, clay and gravel, underlies the alluvial plains of the Russian River and tributary streams. Thickness ranges from less than 10 feet to more than 80 feet. The alluvium supplies most of the groundwater in the area. The specific capacities of irrigation wells completed in to the alluvium generally ranges from 50 to 200 gallons per minute per foot (Cardwell, 1965). Wells located away from the river, where little river channel gravel exists, generally have lower yields. Specific yields ranch between 8 to 20 percent.

The Franciscan Complex is described as relatively impermeable bedrock, consisting mainly of poorly sorted sandstone and shale, with lesser amounts of serpentinite, greenstone, chert, and occasionally schist, and generally occurs at the basin margins. The rocks within the complex are generally cut by many fractures; many springs issue from the fractures and supply water to the local tributaries of the Russian River. Springs, and wells completed in the bedrock, which intersect the fractures, supply water for many rural homes in Cloverdale Valley. Well yields are reportedly low; however, they are generally sufficient for domestic use. Specific yields are very low, reported at three percent.

Groundwater storage capacity in the basin is estimated at 71,000 af with the actual volume of groundwater in storage is estimated to be 55,000 af (DWR, 1983). Groundwater in the basin is generally characterized as moderately hard to hard. Based on data from four wells, TDS values ranged from 130 to 304 mg/l (DWR, 1983). Groundwater is generally suitable for all uses. Based on data reported for three wells in the study area, three have had boron levels exceeding 0.5 mg/l. Boron values below this level are considered satisfactory for all crops; elevated levels may have detrimental effects on crop yields (DWR 1983).

According to the U.S. Environmental Protection Agency's (EPA) Superfund website, one site located at the southern edge of Cloverdale (identified as MGM Brakes) was placed on the Superfund National Priorities List in 1983. Soils on and off-site were reported to contain polychlorinated biphenyls (PCBs) and xylenes. The facility overlies a shallow aquifer 8 to 25 feet below the ground surface. Runoff from the facility drains into Icaria Creek, a tributary to the Russian River. Volatile organic compounds were detected in the groundwater off site.

Remediation of the site was to include excavation and off-site disposal of contaminated soils; natural attenuation was selected to remedy groundwater contamination.

Santa Rosa Valley Groundwater Basin

The Santa Rosa Valley occupies a northwest-trending structural depression in the southern part of the Coast Ranges of northern California, which divides the Mendocino Range on the west from the Mayacmas and Sonoma Mountains on the east. Rincon Valley occupies a portion of a small north to northwest-trending structural trough located east of the larger Santa Rosa Valley and the City of Santa Rosa. This valley is approximately 7 miles long along its eastern edge and varies in width from about 0.5 miles to 2.5 miles. The groundwater basin is divided into three subbasins, the Santa Rosa Plain Subbasin, Healdsburg Area Subbasin, and the Rincon Valley Subbasin.

Santa Rosa Plain Subbasin

The Santa Rosa Plain Subbasin is approximately 22 miles long and 0.2 miles wide at the northern end; approximately 9 miles wide through the Santa Rosa area; and about 6 miles wide at the south end of the valley near the City of Cotati. The Santa Rosa Plain Sub Basin is bounded on the northwest by the Russian River plain approximately one mile south of the City of Healdsburg and the Healdsburg sub basin; mountains of the Mendocino Range flank the remaining western boundary. The southern end of the sub basin is marked by a series of low hills, which form a drainage divide that separates the Santa Rosa Valley from the Petaluma Valley basin south of Cotati. The eastern sub basin boundary is flanked by the Sonoma Mountains south of Santa Rosa and the Mayacmas Mountains north of Santa Rosa. The Rincon Valley sub basin is situated east of the City of Santa Rosa and is separated from the Santa Rosa Plain sub basin by a narrow constriction formed in rocks of the Sonoma Volcanics.

The Santa Rosa Plain Sub basin is drained principally by the Santa Rosa and Mark West Creeks that flow westward and collect into the Laguna de Santa Rosa. The Laguna de Santa Rosa flows northward and discharges into the Russian River. Precipitation in the Santa Rosa Plain ranges from approximately 28 inches in the south to about 40 inches in the north.

The Santa Rosa Plain sub-basin has one main water-bearing unit (Merced Formation) and several units with lower water-bearing capacities (Glen Ellen Formation and Alluvium). The groundwater is not everywhere continuous because many of the units only have lenses of water-bearing material, and the valley is cut by northwest trending faults.

Healdsburg Area Subbasin

The Healdsburg Area subbasin includes the floodplain of the Russian River. To the north it is bounded by the confluence of School House Creek and Dry Creek, and to the south by Lafayette School and the U.S. Government Reservation (Healdsburg). The boundaries are generally defined by alluvium and river channel deposits (DWR 1983). Precipitation in the Healdsburg area subbasin ranges from about 36 inches in the south to about 44 inches in the north (USDA 1999).

The principal water source in the Healdsburg area is alluvium, with secondary sources being the Glen Ellen Formation, alluvial fan and terrace deposits, and the Merced Formation in the south. The Sonoma Volcanics contribute a very limited amount of water (DWR 1983).

Rincon Valley Subbasin

Rincon Valley occupies a portion of a small north to northwest-trending structural trough located east of the larger Santa Rosa Valley and the City of Santa Rosa. This valley is approximately seven miles long along its eastern edge and varies in width from about 0.5 miles to 2.5 miles.

The majority of the valley is bounded by the Napa-Sonoma Volcanic Highlands with two exceptions. On the southeast side, Rincon valley is separated from Kenwood Valley subbasin by Santa Rosa Creek and on the southwest side, Rincon Valley is separated from the Santa Rosa Plain by a narrow constriction formed in bedrock of the Sonoma Volcanics.

Rincon Valley drains to the south through Brush Creek, a small intermittent stream, which is a tributary of Santa Rosa Creek. Precipitation in Rincon Valley ranges from about 32 inches in the south to over 40 inches in the north-northeast.

The primary water-bearing units in the Rincon Valley are Alluvium and the Glen Ellen Formation.

<u>Lower Russian River Valley Groundwater Basin</u>

The Lower Russian River Valley Basin is a narrow meandering river canyon located in the Mendocino Range within west-central Sonoma County. The valley begins approximately 2.5 miles east of Mirabell Heights and extends west and south west for approximately 23 (river) miles until it enters the Pacific Ocean near Jenner. The valley is defined by the aerial extent of alluvial and river-channel deposits that are bounded by bedrock of the Franciscan Complex.

The primary water bearing units of the Lower Russian River Valley are the alluvium and river channel deposits. The deposits are Holocene in age and consist largely of sand and gravel with minor amounts of silt and clay. The alluvium in tributary valleys and in abandoned meanders contains a higher proportion of silt and clay. The thickness of these deposits varies from a thin veneer along the valley margins to greater than 100 feet near the axis of the valley. The maximum thickness of the alluvium in the main bedrock channel has not been determined because no wells have been drilled deeper than 136 feet. The maximum depth of fill at the mouth of the Russian River probably exceeds 300 feet, as evidence by the thickness of the alluvium in valleys in the vicinity of and north of San Francisco Bay. Groundwater in the valley is of the calcium magnesium bicarbonate type and is generally of good quality, except for that in the lower part of the tidal reach of the river. TDS in groundwater ranges from 120 to 210 mg/l (Cardwell, 1965).

The Franciscan Complex that underlies the valley is considered essentially non-water bearing and therefore, does not yield significant quantities of water to wells (Cardwell 1965). The principal use of water in the basin is for the irrigation of agricultural land; water is also used for municipal, domestic, and industrial purposes. Precipitation in the Russian River is distinctly seasonal, about 80 percent of the total occurs during the five months November through March. The bulk of the precipitation occurs during moderately intense general storms of several days duration. Snow falls in moderate amounts at altitudes of 2,000 feet and above.

Groundwater Quality

Groundwater quality data have been compiled from the DWR for some wells within the study area. Water quality data collected from monitoring wells in Sonoma County were also reported as part of the Santa Rosa Subregional Long-Term Wastewater Project (Parsons Engineering Science, 1996). The available groundwater quality data establish the general groundwater quality and allow comparison of existing groundwater quality to recycled water quality. Groundwater in the study area is generally characterized by relatively low concentrations of TDS (100 to 600 mg/l), chloride (1 to 200 mg/l), sulfate (0 to 150 mg/l), and nitrate (0 to 45 mg/l). However, a few locations have nitrate levels of up to 150 mg/l. Dissolved concentrations of iron and manganese exceed the secondary MCL in numerous wells in the Santa Rosa Plain. Concentrations of iron and manganese are reported as high as 1,000 mg/l. High levels of iron and manganese appear concentrated along the eastern portion of the basin in the vicinity of the Rodgers Creek and Healdsburg Faults.

Groundwater quality, notably nitrate concentration, varies substantially from one season to the next and from location to location and may also vary substantially among hydrogeologic units. Therefore, the depth of a well and the screened interval (the portion of the well-casing that is perforated and contributes water to the well) will influence groundwater quality. Groundwater, particularly in the shallow zone, may be influenced by septic systems and/or agricultural uses of the land. For example, the few locations where nitrate levels in groundwater exceed the MCL (10 mg/l nitrate as nitrogen or 45 mg/l nitrate) are likely related to shallow wells affected by septic tank effluent and/or farming activities in these areas.

Groundwater Management Activities

Groundwater basin studies are being conducted within Sonoma County by the SCWA and the USGS and other stakeholders in the Alexander Valley Basin, Sonoma Valley Basin, and the Santa Rosa Plain Subbasin. In 2001, the Agency's Board of Directors authorized the Agency to enter into an agreement with the USGS to develop a cooperative study to characterize the Sonoma and Alexander Valley basins. Within the Sonoma Valley, both the Valley of the Moon Water District and the City of Sonoma served as cooperating agencies for the study, providing data and input throughout the study period. The first basin studies, including the Sonoma Valley and Alexander Valley, have recently been completed (USGS, 2006a and b). The cooperative studies are designed to improve understanding of the groundwater resources and facilitate improved groundwater management strategies. As part of these studies, the USGS evaluated geology, water levels, water quality, surface water and groundwater interactions, and recharge areas. In addition, a groundwater model was developed for the Sonoma Valley to assist in identifying problem areas within the basin and to simulate future groundwater conditions under various potential scenarios.

Surface Water

Mean annual precipitation in the project area varies from about 30 inches in the flat valley lands north of Santa Rosa to about 50 inches in the hills west of Healdsburg. Generally rainfall increases with elevation, with the centers of greatest precipitation at the highest ridges. Approximately 84 percent of annual precipitation occurs during the five-month period of November through March. Summers are dry with total rainfall from June through August averaging less than 0.5 inches.

Precipitation that lands on impermeable surfaces, or that falls at a greater rate than a permeable surface's ability to absorb, will become runoff or surface water. The area that drains to a single creek or a river is called a watershed. Dams are sometimes used at strategic locations within a watershed to capture and store runoff when flows are greater than demands and to release water as needed for diversions for a more even distribution of water supply throughout the year.

The term watershed refers to an area that is tributary to or drains to a particular river of creek system. Hydrologically, land in Sonoma County falls within seven distinct watersheds, of which the Russian River watershed is the largest in terms of area, runoff volume, number of cities and population. Due to the large size of the Russian River watershed and the complexity of the coastal watersheds, the Russian River watershed and several of the coastal watersheds are divided or grouped into subbasin units whose size and boundaries are determined by several common traits, including runoff patterns, geology, topography, vegetation, and land use. These watersheds and subbasins are illustrated in Figure 3.8-2.

The NSCARP area is within the Russian River Watershed. The Russian River watershed occupies much of both Mendocino and Sonoma counties. The watershed occupies an area of roughly 1,485 square miles, approximately 770 square miles of which are located in Sonoma County. The NCRWQCB has classified the entire Russian River watershed as an impaired water body due to excessive sedimentation and siltation. The impairment is attributed to historic grazing, agriculture, logging, road construction, and habitat modification.

The Russian River and Dry Creek are the primary watercourses passing through the study area. The Russian River originates in Mendocino County and flows southerly thence westerly through Sonoma County, discharging to the Pacific Ocean at the community of Jenner (see Figure 2-1). Dry Creek originates in southern Mendocino County and flows southeasterly through Sonoma County to the Russian River. These watercourses are fed by numerous perennial and intermittent tributary streams. While the Russian River and Dry Creek maintain some hydrologic characteristics typical of northern California coastal streams (high winter flows, low summer flows), the development of two relatively large storage reservoirs (Lake Sonoma and Lake Mendocino), and numerous smaller agricultural and municipal diversions, along with diversion of approximately 150,000 af of Eel River water into the East Fork of the Russian River by PG&E through its Potter Valley Project hydroelectric facilities, has altered the natural hydrology. A potential annual reduction in diversions from the Eel to The Russian River was imposed by the Federal Energy Regulatory Commission during the recent re-licensing of the Potter Valley Project under ESA Section 7 consultation with NOAA Fisheries.

Two major dams exist in the Lower Russian River basin. Coyote Dam, which created Lake Mendocino, is located on the East Fork of the Russian River just north of Ukiah. The lake Mendocino stores about 122,400 af of water and is used for water supply, recreation, flood control, and augmentation of summer stream flows in the Russian River. The dam and the reservoir were built by the U.S. Army Corps of Engineers (USACE) in 1958 (DWR, 1994). Warm Springs Dam was completed by the USACE in 1982 and is located on Dry Creek, approximately 15 miles upstream from its confluence with the Russian River. Lake Sonoma has a capacity of 381,000 af and is used for water supply, flood control, augmentation of summer flow, and recreation (DWR, 1994).

Several communities in the Lower Russian River basin, including Ukiah, Cloverdale, Healdsburg, Windsor, Santa Rosa, and Guerneville, discharge treated wastewater to the Russian River. Some of the discharges are direct and occur only seasonally, others are continuous but indirect (e.g., percolation ponds).

Streamflows in the Russian River basin vary widely. Flows range from floods during winter months to small flows and even no flows in some tributaries during dry summer months. Rainfall over the basin is considerable, averaging 41 inches per year. Eighty percent of the annual runoff occurs between December and March. Because winter storms often produce extended periods of intense rainfall over the drainage basin, flooding is frequent and severe. In 1986, a record river flow of 102,000 cfs occurred at Guerneville, producing severe flooding. In 1995, the instantaneous peak flow at Guerneville was 93,900 cfs.

Tributary streams often dry completely during the summer, although subsurface flow may still occur in the streambed gravel. This absence of summertime surface flow can occur as a result of natural causes or from the diversions of water for agricultural purposes. In the Russian River, minimum streamflows are maintained by SCWA during the summer as required by SCWA's water rights permits, and by releases from Lake Mendocino and Lake Sonoma. Summertime flow in the Russian River would be considerably less without these releases.

The USGS has historically operated flow-gauging stations in the Russian River watershed. A summary of historical gaged flow at two USGS gaging stations within the study area are shown in Table 3.8-1. These flows are impaired and regulated to the extent of diversions and impoundment existing during the period of record.

Table 3.8-1. Historical Age Flows of Russian and Dry Creek

USGS No.	Name	Period of Record	Mean Annual Flow (acre-feet)	Mean Monthly Flow	
				Lowest Month (acre-feet)	Highest Month (acre-feet)
#11464000	Russian River Near Healdsburg	Oct. 1939 to Sept. 2003	1.04 million	11,300	250,600
#11465000	Dry Creek below Warms Springs Dam near Geyserville	Oct. 1981 to Sept. 2003	172,000	4,900	30,700

Figure 3.8-2. Watersheds

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Principal tributaries of the Russian River are the East Fork of the Russian River, Big Sulphur Creek, Mark West Creek, Maacama Creek, and Dry Creek. Big Sulfur Creek originates on the Mayacamas Mountains north of Healdsburg and flows northwest to enter the Russian River near Cloverdale. The Sulphur Creek watershed encompasses over 85 square miles with headwaters on the flanks of Cobb Mountain to over 4,700 msl. Tributaries include Little Sulphur, Pine, Cobb, Squaw, and Frasier Creeks. Little Sulphur Creek is the largest tributary with a watershed area of over 30 square miles. Pine Flat Road crosses both Big and Little Sulphur Creeks in the upper reaches. Dry Creek drains much of the western half of the Russian River watershed. Mark West Creek enters the Russian River at Mirabel Park near Forestville, and drains approximately 52 square miles. The Laguna de Santa Rosa, which empties into Mark West Creek approximately 2.5 miles upstream from its confluence with the Russian River, is a natural overflow basin for the Russian River.

The direction of flow may be to or from the Russian River during floods, with the Laguna de Santa Rosa sometimes acting as a natural regulator of floodwaters on the lower Russian River.

The Laguna is a wide, marshy area of approximately 255 square miles lying along the western edge of the Santa Rosa Plain that drains to the Russian River. During large storm events the Laguna becomes a lake, temporarily storing water that would other wise increase flood peaks further down the Russian River. As the water level in the Russian River rises, water backs up in to the Laguna, impeding downstream flow from the Laguna watershed itself.

Surface Water Quality

The NCRWQCB and several other agencies have monitored the water quality of the Russian River watershed since the early 1970s. Monitoring results indicate that levels of total nitrate, total phosphate, dissolved oxygen (DO), hydrogen ion concentration (pH), and toxic chemical (carcinogenic and non-carcinogenic organic chemicals) concentration area, for the most part, in compliance with water quality objectives. Elevated water quality constituents in the main stem of the Russian River are generally associated with total dissolved solids (TDS), turbidity, and high bacteria concentrations. Recreational users and malfunctioning individual septic systems contribute to the introduction of fecal coliform bacteria in the river.

Overall, Sonoma County is predominately rural, with relatively few areas of intense development. Although land use changes have negatively impacted the water quality of some waterways in the county, water in the county is generally considered to be of good quality. While the EPA and the RWQCBs do not compile a list of waterways that have good water quality, they do compile a list of waterways that do not meet the water quality standards set forth by the EPA. The seven waterways in Sonoma County that have been placed on a Section 303(d) list by either the RWQCBs or the EPA include the Estero Americano, Gualala River, Russian River, Stemple Creek, San Pablo Bay, Petaluma River, and Sonoma Creek (Sonoma County PRMD, 2005). The most prominent water quality problems affecting waterways within the county are (1) sedimentation and siltation; (2) nutrients; and (3) pathogens or high bacteria levels.

Sedimentation and Siltation

Sedimentation and siltation problems are widespread throughout the county. Although this can be partially attributed to local topography, geology, and soils, land use practices are also to blame. Several common causes of excess erosion, sedimentation, and siltation are described here. Agricultural practices, particularly more intensive agricultural land use, can result in an increase in sediment in local waterways. Farming and intensive grazing on steep slopes with erosive soils, creating poor ground cover conditions, can lead to accelerated erosion and sedimentation of the waterways. Road and highway construction has also contributed to sedimentation of the waterways.

Nutrients

In the context of water quality, the term nutrients typically refer to excess concentrations of nitrogen and phosphorus. Several anthropogenic or man-caused sources of nutrients are known to affect water quality in Sonoma County. Farmers apply chemical fertilizers to crops in the form of nitrogen, phosphorus, and potassium. These elements are also concentrated in manure lagoons and wastewater from septic systems. These elements, when transported via land spreading and runoff or through direct or indirect wastewater discharges to streams, rivers, or lakes, result in excessive algal growth, which in turn increases the turbidity of the water and results in diminished water quality.

Pathogens

The presence of coliform bacteria in water, which are normally found in the intestines of humans and animals, signals that disease-causing pathogens may be present. Elevated levels of fecal coliform bacteria are the most common pathogen problem affecting the quality of water in Sonoma County. Pathogens enter water through wastewater discharges, leaking septic systems, and from animal waste, including from animal concentration areas such as feedlots and dairies. Giardia and cryptosporidium are also pathogens that are occasionally found in public water supplies and have the potential to cause serious illness among people.

Recycled Water Quality

There are three wastewater plants that would provide recycled water to NSCARP. They are the Santa Rosa, Windsor, and ALWSZ facilities. Recycled water quality for the NSCARP from the Santa Rosa facility is summarized below in Table 3.8-2. Other recycled water quality summaries for the ALWSZ and Windsor facilities are provided in Table 3.12-2 in Section 3.12 - Public Health and Safety.

Table 3.8-2. Santa Rosa's Recycled Water Quality Summary
(concentration in µg/L unless otherwise noted)

Constituent	Mean[1]	Median[2]	Max. Detected	Number of Detected Values[3]	CTR Aquatic Life (chronic/ acute)[4]	CTR Human Health	Basin Plan
Aluminum	32.1	20	150	75	--	--	750 (acute) No chronic criterion[5]
Arsenic	1.8	ND	3.0	1	150/340	--	--
Cadmium	0.20	ND	--	0	2.1/5.0[a]	--	--
Chromium	0.92	ND	--	0	170/620 (Chrom. III[a] 11/16 (Chrom. VI)	--	--
Copper	8.6	9.45	14	16	8.5/10.2[a]	1300	--
Lead	1.9	ND	5.8	1	2.4/76[a]	--	--
Mercury	0.09	ND	--	0	--	0.05	--
Nickel	3.4	ND	7.3	10	50/531[a]	610	--
Silver	0.25	ND	--	0	3.1/4.5[a,b]	--	--
Thallium	1.1	ND	--	0	--	1.7	--
Zinc	26.8	28.5	35	17	113/133[a]	--	--
1,4 Dichlorobenzene	0.34	ND	0.60	4	--	400	--
Gamma-BHC	0.024	ND	0.020	1	0.95[b]	0.019	--
Endosulfan II	0.028	ND	0.080	1	0.056/0.22	110	--
Ammonia (mg N/L)	0.60/2.6[1]	--	12	--	--	--	15.4 (acute) 3.24 (chronic)
Total Coliform Bacteria (MPN/100 mL)	--	<2.0	240	--	--	--	Median fecal coliform < 50/100ml for any 30-day period Total fecal <10% of samples > 400/100 ml for any 30-day period

Table 3.8-2. (Continued)

Constituent	Mean[1]	Median[2]	Max. Detected	Number of Detected Values[3]	CTR Aquatic Life (chronic/ acute)[4]	CTR Human Health	Basin Plan
E. Coli (MPN/100 mL)	2.0 (max. 30-day mean)	2.0	2.0	3	--	--	30-day mean = 126; Max. conc.: designated bathing beach =235; Moderate use for bathing = 298; Light use for bathing = 410; Infrequent use for bathing = 576
Enterococci (CFU/100 mL	3.8 (max. 30-day mean)	ND	--	0	--	--	[c]30-day = 33; Max. conc.: designated bathing beach = 61; Moderate use for bathing = 78; Light use for bathing = 107; Infrequent use for bathing = 151
Chlorine (total residual)(mg/l)	0.11	--	--	0	--	--	0.019 (acute) 0.011 (chronic)[c]
Conductivity (µmhos/cm)	707	--	942	--	--	--	Russian River upstream 90% upper limit = 320; Russian River upstream 50% upper limit =250; Russian River downstream 90% upper limit = 375; Russian River downstream 50% upper limit = 285
Cyanide	4.4	3.0	16	6	5.2/22	700	--
pH	7.4	--	6.0/8.2[d]	--	--	--	Min.: 6.5 Max.: 8.5
Temperature (°F)[d]	69	--	79	--	--	--	5°F increase above natural receiving water temperature
TDS (mg/l)	432	--	528	--	--	--	Russian River upstream 90% upper limit = 170; Russian River upstream 50% upper limit = 150; Russian River downstream 90% upper limit = 200; Russian River downstream upper limit = 170
Turbidity (NTU)	0.51	--	2.6	--	--	--	< 20 percent above naturally occurring background

Table 3.8-2. (Continued)

Constituent	Mean[1]	Median[2]	Max. Detected	Number of Detected Values[3]	CTR Aquatic Life (chronic/ acute)[4]	CTR Human Health	Basin Plan
Gross alpha radionuclides (pCi/l)	0.98	0.15	2.9	4	--	--	15
Gross beta radionuclides (pCi/l)	10.4	10.4	10.9	4	--	--	50

Notes:

ND = Not Detected

1 Averages were calculated using one-half the reporting limit when a constituent was below detection. For ammonia the first number is the average of monthly averages and the second number is the maximum of monthly averages. The maximum monthly average is presented because the chronic criterion is for ammonia is a thirty-day average. Since both the average and the median can contain a number of values below detection, the maximum detected value can be lower than the mean or median.

2 Several substances in the "other constituents" group do not show a median and number of detected values because the database upon which this table is based gives only the monthly average, minimum and maximum

3 Number of detected values refers to the number of measurements where the result was above the reporting limit.

4 The first value shown is the chronic criterion. The second value shown is the acute criterion. The CTR aquatic life metals criteria are for dissolved metals. However, the criteria are shown in the total metals column since for the impacts analysis, the total recycled water concentrations will be evaluated relative to the criteria.

5 These objectives have been recommended as Basin Plan amendments (North Coast Regional Board, July 23, 2001 Staff Report - Prioritization of Basin Plan Issues) and are U.S. EPA criteria. Aluminum and residual chlorine criteria are from U.S. EPA (2002), ammonia criterion is from EPA (1999), and bacteria criteria are from U.S. EPA (1986).

a For hardness dependent criteria, the 90th percentile lowest hardness (90 percent of the values were greater) in the Laguna upstream of discharge was used (94.5 mglL as CaCo3) to calculate the chronic criterion. This value was lower, thus more conservative, than the 90th percentile hardness in the Russian River. The median hardness (116 mg/l as CaCO3) for the Russian River (which was lower than for the Laguna) was used to calculate the acute criteria.

b No chronic criteria exist for these constituents. The values shown are the acute criteria.

c These objectives have been recommended as Basin Plan amendments (North Coast Regional Board, July 23, 2001 Staff Report - Prioritization of Basin Plan Issues) and are U.S. EPA criteria. Aluminum and residual chlorine criteria are from U.S. EPA (2002), ammonia criterion is from EPA (1999), and bacteria criteria are from U.S. EPA (1986).

d Minimum and maximum pH values are shown

3.8.2 Regulatory Setting

Federal Clean Water Act (CWA)

The Federal Water Pollution Control Act Amendments of 1972 and 1987, collectively known as the Clean Water Act (33 United States Code [USC] §1251 et seq.), establish the principal Federal statutes for water quality protection. The Clean Water Act (CWA) was established with the intent "to restore and maintain the chemical, physical, and biological integrity of the nation's water, to achieve a level of water quality which provides for recreation in and on the water, and for the propagation of fish and wildlife." According to the 1998 National Water Quality Inventory (Inventory), a biennial summary of State surveys of water quality mandated by CWA, approximately 40 percent of the nation's waters that were assessed did not meet water quality standards that have been established by the Federal and State governments.

The Inventory lists 21,845 water bodies as "impaired", or not meeting water quality standards, including over five million acres of lakes and estuaries, and over 300,000 river and shoreline miles. Approximately 218 million Americans live within ten miles of a water body designated as impaired. The three most common causes of water body impairment listed in the Inventory are sediments, nutrients, and pathogens. Other main causes of impairment listed include lower dissolved oxygen concentrations, habitat and flow alterations, changes in pH, and inputs of metals, mercury, and pesticides. The 1998 Inventory indicates that approximately ten percent of impaired waters are affected solely by point sources, approximately 47 percent by a combination of point and non-point sources; and, 43 percent solely by non-point sources. There are several key sections of CWA that guide the regulation of water pollution in the United States.

Section 208, Water Quality Control Plans

This section of the CWA requires the preparation of local water quality control plans throughout the nation. Each water quality control plan covers a defined drainage area. The primary goal of each water quality control plan is to attain water quality standards established by CWA and the State governments within the defined area of coverage. Minimum content requirements, preparation procedures, time constraints, and Federal grant funding criteria pertaining to the water quality control plans are established in Section 208. Preparation of the water quality control plans has been delegated to the individual States by the EPA.

Section 303(d) of the Clean Water Act

Section 303(d) of the CWA requires states to identify waters where the permit standards, any other enforceable limits, or adopted water quality standards are still not attained. Lists of prioritized impaired water bodies are known as the "303(d)" lists and must be submitted to the USEPA every two years. The Russian River is currently listed as impaired for sedimentation/siltation with the State 2002 listings for the Russian River adding pathogens and temperature. However, Total Maximum Daily Loads (TMDLs) have not yet been established for sedimentation/siltation, pathogens, and temperature. TMDLs, which are the maximum amount of a pollutant that a water body can receive and still meet water quality standards, have only been established for total nitrogen and ammonia in the Laguna, which was previously listed for dissolved oxygen and ammonia but has been de-listed for these constituents. However, the State 2002 list includes re-listing the Laguna for dissolved oxygen.

Section 401, Water Quality Certifications

This section of CWA requires that, prior to the issuance of a Federal license or permit for an activity or activities that may result in a discharge of pollutants into navigable waters (see Section 404 discussion, below), the permit applicant must first obtain a certification from the State in which the discharge would originate. A State certification indicates that the proposed activity or activities would not result in a violation of applicable water quality standards established by Federal or State law, or that there are no water quality standards that apply to the proposed activity. Water quality certifications would be required as part of any Section 404 permits issued by the USACE for fill activities affecting a "water of the U.S."

Section 402, National Pollution Discharge Elimination System (NPDES)

NPDES requires permits for pollution discharges into water bodies such that the permitted discharge does not cause a violation of Federal and State water quality standards. NPDES permits define quantitative and/or qualitative pollution limitations for the permitted source, and control measures that must be implemented to achieve the pollution limitations. Pollution control measures are often referred to as Best Management Practices, or BMPs. Simply put, BMPs are practical ways of reducing water pollution, such as the installation of filtration equipment to remove pollutants from industrial wastewater. Other types of BMPs include periodically cleaning out urban storm drains to reduce pollutant loads (e.g., debris, sediments, etc.) in urban storm water runoff, and installing soil containment devices (e.g., silt fencing) around construction sites to reduce erosion of sediments into surface waters.

Section 402 identifies the types of dischargers that are required to obtain NPDES permits, and establishes a timetable for NPDES program implementation, which is being carried out in two major phases: Phases I and II. Since 1990, Phase I NPDES regulations have required permits for storm water discharges from the following types of sources:

- Major industrial point sources such as wastewater treatment plants, electricity generating stations, industrial factories, mining operations, etc.;
- Construction activities disturbing five or more acres or land, and;
- Municipal storm water systems serving populations of 100,000 persons or more.

In 1999, USEPA established Phase II NPDES regulations, which expanded the existing NPDES program to include the following categories of pollution sources:

- All municipalities within designated urbanized areas, and small municipalities outside of designated urbanized areas with a population of at least 10,000 and/or a population density of at least 1,000 persons per square mile, and;

- Construction activities that disturb between one and five acres of land.

The proposed project would be subject to the Statewide General Permit for Storm Water Discharges Associated with Construction Activity. This permit applies to all construction projects that would disturb more than 5 acres, and requires the development and implementation of a Storm Water Pollution Prevention Plan, (SWPPP) including all applicable BMPs, and to eliminate or reduce non-storm discharges to storm water systems and other waters of the U.S.

Section 404, Discharge of Dredge and Fill Material

See Section 3.4 - Biological Resources.

Antidegradation Policies

The USEPA and SWRQCB have established antidegradation policies. The Federal policy, which is set forth in 40 CFR 131.12, states that:

> “Existing instream water uses and the water quality necessary to protect existing uses (e.g., fish spawning, municipal water supply, and warm water aquatic habitat) shall be maintained and protected. Where the quality of waters exceeds levels necessary to support beneficial uses, that quality shall be maintained and protected unless the State finds that allowing water quality degradation is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing water quality degradation, the State shall assure water quality is adequate to fully protect beneficial uses.”

As required by 40 CFR 131.12, the State has developed an Anti-degradation Policy that is consistent with the Federal policy described above; the state policy is described in the Administrative Procedures Update of July 2, 1990 entitled Anti-degradation Policy Implementation for NPDES Permitting. The Anti-degradation Policy applies to inland surface waters, ocean waters, and groundwaters.

The State Anti-degradation Policy includes a technical component (water quality and beneficial-use impacts) and a non-technical component (necessity for socioeconomic development, maximum public benefit).

In 1968, the SWRCB adopted Resolution 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California State," establishing a nondegradation policy for the protection of water quality. Under this policy, whenever the existing quality of water exceeds the quality necessary to maintain present and potential beneficial uses of the water, existing water quality must be maintained. This policy pertains to both surface waters and the groundwater of the State.

The Water Quality Control Plan (Basin Plan) for the North Coast Region (North Coast RWQCB, 1994) establishes water quality objectives that are considered to be necessary to protect present and probable future beneficial water uses. The NCRWQCB amended the Basin Plan to include language summarizing the state and federal antidegradation policies to ensure the implementation of these water quality objectives.

The NSCARP would require waste discharge requirements approved by the North Coast RWQCB. The RWQCB would consider potential groundwater impacts of the NSCARP in the context of the adopted Basin Plan and would require that best practicable treatment or discharge control be included in approved waste discharge requirements. Some degradation of water quality may be considered acceptable if it can be demonstrated that the NSCARP would be “consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial uses of such water, and will not result in water quality less than that prescribed in the policies” (Resolution No. 68-16).

The California State Water Code specifically allows increases of salinity associated with water reclamation projects: "A regional board may not deny issuance of water reclamation requirements to a project which violates only a salinity standard in the basin plan." (Division 7, Chapter 7, Section 13523.5 of the California State Water Code). Therefore, it is possible that Waste Discharge Requirements may be approved that could result in some increase in chemical concentrations in groundwater above background levels. However, in no case may increases in chemical concentrations cause adverse impacts to groundwater resources. Nitrate levels in excess of the maximum contaminant limit for drinking water (10 mg/l) would be considered an adverse effect. Waters in which salinity, as measured by TDS, exceed 3,000 mg/l are considered unsuitable for water supply (SWRCB Resolution No. 88-63, "Sources of Drinking Water).

California Toxics Rule

The USEPA’s California Toxics Rule (CTR) was promulgated on May 18, 2000. The criteria largely reflect the existing criteria contained in the U.S. EPA’s 304(a) Gold Book (Water Quality Criteria 1986) and its National Toxics Rule adopted in December 1992 (57 Federal Register 60848) and revised in December 1998, and those of earlier state plans (the Inland Surface Waters Plan and the Enclosed Bays and Estuaries Plan of April 1991, since rescinded). With promulgation of the CTR these federal criteria are legally applicable in the State of California for inland surface waters, enclosed bays and estuaries for all purposes and programs under the CWA. Therefore, they provide water quality criteria through which impacts to surface waters can be evaluated.

State Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP)

The SIP was adopted by the SWRCB on March 2, 2000 and became effective on May 22, 2000. The goal of the SIP is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency. As such, the SIP is considered to be a tool to be used in conjunction with watershed management approaches and, where appropriate, the development of TMDLs to ensure achievement of water quality standards.

Water Quality Control Plans (Basin Plans)

The study area lies primarily within the jurisdiction of the North Coast Regional Water Quality Control Board (North Coast RWQCB). The RWQCBs are responsible for the protection of beneficial uses of water resources within their respective regions. They use planning, permitting, and enforcement authorities to meet this responsibility, and have adopted the Basin Plans for the North Coast Region (1994) to implement plans, policies, and provisions for water quality management. Beneficial uses of surface waters are described in the Basin Plans and are designated for major surface waters and their tributaries. The Basin Plans also establish numeric and narrative objectives for protection of beneficial uses, and set forth policies to guide the implementation of programs to attain the objectives.

California Porter-Cologne Act

The Porter-Cologne Act (California Water Code Section 13000) is the principal law governing water quality regulation in California. It establishes a comprehensive program to protect water quality and the beneficial uses of water.

The Porter-Cologne Act applies to surface waters, wetlands, and groundwater, and to both point and non-point sources of pollution. The following State policies are pursuant to the Porter-Cologne Act:

- The quality of all the waters of the State shall be protected;
- All activities and factors affecting the quality of water shall be regulated to attain the highest water quality within reason, and;
- The State must be prepared to exercise its full power and jurisdiction to protect the quality of water in the State from degradation.

The responsibility for protection of water quality in California rests with the SWRCB, pursuant to the Porter-Cologne Act. The SWRCB administers Federal and State water quality regulations for California's ocean waters, and also oversees and funds the State's nine RWQCBs. The RWQCBs prepare water quality control plans, establish water quality objectives, and carry out Federal and State water quality regulations and permitting duties for inland water bodies, enclosed bays, and estuaries within their respective regions. The Porter-Cologne Act gives the

SWRCB and RWQCBs broad powers to protect water quality by regulating waste dischargers to water and land, and requiring clean up of hazardous wastes.

The RWQCBs regulate discharges under the Porter-Cologne Act primarily through issuance of NPDES permits and waste discharge requirements. Anyone discharging or proposing to discharge materials that could affect water quality (other than to a community sanitary sewer system regulated by an NPDES permit) must file a report of waste discharge. The Porter-Cologne Act provides RWQCBs with several options for enforcing regulations, including cease and desist orders, cleanup and abatement orders, administrative civil liability orders, civil court actions, and criminal prosecutions.

Title 22

Criteria for recycled water quality are established under Title 22 of the California State Code of Regulations (Title 22, California State Code of Regulations, §60301 et. seq.). Title 22 specifies treatment requirements and establishes water quality standards for recycled water (Water Recycling Criteria). These regulations are summarized in Section 3.12, Public Health and Safety. The California State Department of Health Services (DHS) is the agency responsible for development and implementation of the regulations for use of recycled water. With recycled water, a key concern is the potential risk of human exposure to pathogenic organisms; therefore, the recycled water is required to comply with water quality standards set under Title 22.

Refer to Section 3.9, Table 3.9.3 for a list of applicable goals, objectives, and policies of the Sonoma County General Plan regarding hydrology.

Sonoma County NPDES Stormwater Permits

<u>Municipal Permit</u>

The County has developed a Stormwater Management Plan (SWMP) for its Phase II General MS4 Permit to reduce discharge of pollutants to the maximum extent practicable and to protect water quality (Sonoma County, 2005). The SWMP specifies best management practices (BMPs) to address certain program areas. The program areas include public education and outreach, illicit discharge detection and elimination, construction activities, post-construction stormwater management, and good housekeeping for municipal operations (Sonoma County and SCWA, 2004). Sonoma County and SCWA are required to maintain, implement, and enforce an effective SWMP. The SWMP serves as the framework for identification, assignment, and implementation of control measures or BMPs that would be adopted for NSCARP (SWRCB, 2003).

<u>General Construction Permit</u>

Construction activities of one acre or more are regulated by the RWQCB and are subject to the permitting requirements of the NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Construction Permit). The project applicant must submit a Notice of Intent (NOI) to the RWQCB to be covered by the General Permit prior to the beginning of construction. The General Construction Permit requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must be prepared before project construction begins and include specifications for BMPs that would be implemented during construction. BMPs are measures undertaken to control degradation of surface water by preventing soil erosion or the discharge of pollutants from the construction area.

Additionally, the SWPPP describes measures to prevent or control runoff after construction is complete and identifies procedures for inspecting and maintaining facilities or other project elements. Required elements of a SWPPP include:

- Site description addressing the elements and characteristics specific to the site;
- Descriptions of BMPs for erosion and sediment controls;
- BMPs for construction waste handling and disposal;
- Implementation of approved local plans;
- Proposed post-construction controls; and,
- Non-stormwater management.

Construction Dewatering Permit

Construction activities, such as excavation and trenching in areas with shallow groundwater, would require dewatering, which would be subject to the RWQCB construction dewatering permit requirements. Dewatering operations are regulated under state requirements for stormwater pollution prevention and control. Discharge of non-stormwater from a trench or excavation that contains sediments or other pollutants to sanitary sewer, storm drain systems, creek bed (even if dry), or receiving waters is prohibited. Discharge of uncontaminated groundwater from dewatering is a conditionally exempted discharge by the RWQCB. However, the removed water could potentially be contaminated with chemicals released from construction equipment or sediments from excavation. Therefore, disposal of dewatering discharge would require permits either from the RWQCB for discharge to surface creeks and groundwater or from local agencies for discharge to storm or sanitary sewers. The RWQCB lists non-stormwater discharge controls specifically for dewatering operations (RWQCB, 2003b). Discharge of water resulting from dewatering operations would require an NPDES Permit, or a waiver (exemption) from the RWQCB, which would establish discharge limitations for specific chemicals (if they occur in the dewatering flows).

Grading Permit

Construction in Sonoma County is subject to the Uniform Building Code (UBC) grading provisions (Chapter 7 of the Sonoma County Code (SCC) relates to erosion and sediment control provisions and Chapter 11 of the SCC relates to drainage requirements). The UBC provisions require a grading permit for any project that involves excavation of more than 50 cubic yards of earth material (with exceptions for certain specified types of excavations), creating cut slopes greater than two feet, or importing fill greater than one foot in depth. The UBC specifies certain thresholds for requiring engineered grading plans (e.g., volume of earth material being moved). If an engineered grading plan is required, a report certifying that the Proposed Project, including any erosion and sediment control facilities, has been constructed as designed, would need to be submitted prior to final inspection (Sonoma County, 2003).

3.8.3 CEQA Thresholds of Significance Criteria

An impact to hydrology and/or water quality would be considered significant if the impact would result in any of the following criteria, which are adapted from Appendix G of the CEQA Guidelines:

1. Violate any water quality standards or waste discharge requirements;

2. Substantially degrade water quality;

3. Substantially alter the existing drainage pattern of the site or area (including through the alteration of the course of a stream or river) in a manner that would result in substantial erosion, siltation, on- or off-site;

4. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or proposed uses for which permits have been granted);

5. Substantially alter the existing drainage pattern of the site or area (including through the alteration of the course or by substantially increasing the rate or amount of surface runoff) in a manner that would result in flooding on- or off-site;

6. Create or contribute substantial runoff that would exceed the capacity of existing or planned stormwater drainage systems;

7. Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

8. Place within a 100-year flood hazard area structures that would impede or redirect flood flows;

9. Expose people or structures to a substantial risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam;

10. Be subject to inundation by seiche, tsunami, or mudflow; or

11. Contaminate a public water supply.

3.8.4 Alternatives Analysis

Alternative 1 - No Project/Action

The “No Action” Alternative means that the SCWA would not implement a regional water conveyance and storage project to serve recycled water to the NSCARP area. As no project construction or operational activities would occur; there would be no impact to water quality or hydrology as a result of implementation of Alternative 1. However, there would be no offset of instream and groundwater sources with recycled water; thus, there would be no long-term beneficial effect to the Russian River and its tributaries.

Alternative 2 - Entire NSCARP Area

Impact HWQ-1: Construction of NSCARP could result in increased erosion and subsequent sedimentation, degradation of surface runoff quality, with impacts to water quality.

Discussion:

Pipelines. Construction of the proposed pipelines would involve earthmoving activities, such as excavation, grading, soil stockpiling, and filling. Pipeline construction would occur through trenching, jack and bore tunneling or directional drilling. Construction of pipeline by suspending the pipe on a bridge would require less earth movement. Alternative 2 involves the following creek/river crossings (Table 3.8-2):

Table 3.8-3. Alternative 2 – Pipeline Crossings

Subarea	Project Component	# of Crossings
Alexander Valley		
	Crossing(s) of Russian River	1
Dry Creek		
	Crossing(s) of Dry Creek	3
Russian River Valley		
	Crossing(s) of the Russian River	2
	Crossing(s) of Mark West Creek	1
Northern Alexander Valley		
	Crossings of the Russian River	2

Construction activities could result in soil erosion and subsequent discharge of sediment to adjacent surface water or drainages. Sedimentation to the waterways could degrade water quality for beneficial uses by increasing channel sedimentation and suspended sediment levels (turbidity) reducing the flood-carrying capacity, and adversely affecting associated aquatic and riparian habitats. Additionally, sedimentation to local drainage facilities could result in reduced storm flow capacities, resulting in localized ponding or flooding during storm events.

Jack and bore tunneling or directional drilling would occur below the bed of the channels and result in no impact to aquatic species unless a frac-out was to occur. A frac-out, in which the drilling muds could enter a live stream via fissures in the substrate between the channel bed and bore, would release drilling muds into the river, which would increase turbidity and, depending on the volume of release, cover the channel bed with bentonite and other compounds.

Hazardous materials associated with construction, such as fuels, oils antifreeze, coolants, and other substances could adversely affect water quality if inadvertently released to surface waters.

Reservoirs. Construction of the nineteen storage reservoirs would involve grading, excavation, and hauling activities. Water quality impacts resulting from construction of the reservoirs would be similar to the impact discussed for the recycled water pipelines. Typical activities for reservoir construction would include mobilization of construction equipment, clearing and grubbing of the reservoir area, on-site borrow area excavation, earthwork fill placement for reservoir construction, earthwork fill placement for reservoir lining, and construction of appurtenant structures and ancillary facilities, such as spillway, inlet-outlet conduits, stormwater routing around the reservoir, access roads, fencing, and construction of dam instrumentation, such as piezometers, survey/settlement monuments, etc. This would be followed by site clean-up and demobilization.

Construction of the reservoirs would involve activities, such as excavation and stockpiling that would cause soil erosion and sedimentation into nearby ditches and streams. Construction would involve chemicals and hazardous materials, which if not properly handled, would inadvertently get released into adjacent surface waters.

Pump Stations. Construction of the booster pump stations and distribution pump stations (total of 16) would not involve heavy construction activities. Each site would be graded and prepared to raise a building structure. Construction would involve paving a 625-square-foot site for the booster pump stations and a 2,500-square-foot site for the distribution pump stations, and installing pumping equipment and connecting appurtenances in the building. These activities could cause dislodging of soil particles and potential sedimentation.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criteria: 1, 2, 3, and 4

Mitigation Measure HWQ-1: The SCWA shall file a NOI prior to construction, direct the contractor to develop and implement a SWPPP, and file a Notice of Termination (NOT) at the end of construction. The SWPPP shall be maintained at the site for the entire duration of construction.

The objectives of the SWPPP are to identify pollutant sources that may affect the quality of stormwater discharge and to implement BMPs to reduce pollutants in stormwater discharges. The SWPPP for this proposed action shall include the implementation, at a minimum, of the following elements:

- Source identification;
- Preparation of a site map;
- Description of construction materials, practices, and equipment storage and maintenance;
- List of pollutants likely to contact stormwater;
- Estimate of the construction site area and percent impervious area;
- Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in stormwater runoff, such as detention basins, straw bales, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes;
- Proposed construction dewatering plans;
- List of provisions to eliminate or reduce discharge of materials to stormwater;
- Description of waste management practices;
- Spill prevention and control measures;
- Maintenance and training practices; and
- Sampling and analysis strategy and sampling schedule for discharges from construction activities

Impact after Mitigation: Less than Significant. With implementation of mitigation, impacts are expected to be less than significant.

Impact HWQ-2: Construction activities associated with excavation could result in the dewatering of shallow groundwater resources and contamination of surface water.

Discussion: Groundwater levels vary throughout the project area and depths of excavation would vary with each project component. Project construction activities, particularly trenching (for all project facilities), jack and bore tunneling, and directional drilling (for recycled water pipelines) may intercept shallow or perched groundwater, requiring temporary localized dewatering to facilitate construction. Construction of pump stations could involve excavation for foundations where shallow groundwater could occasionally be encountered. Construction activities could locally increase turbidity in groundwater if shallow groundwater or locally perched zones are encountered. Groundwater would be pumped and discharged to the local drainage system. Water from dewatering operations could contain materials used during typical construction activities, such as silt, fuel, grease, or other chemicals. The discharge from construction dewatering could contaminate downstream surface water.

Impact Category: Significant but Mitigable

Threshold of Significance Criterion: 2

Mitigation Measure HWQ-2: The SCWA shall comply with the following NPDES permit requirements imposed by the RWQCB for dewatering activities:

- The NCRWQCB would require compliance with certain provisions in the permit, such as treatment of flows prior to discharge. As such, the SCWA shall discharge the groundwater generated during dewatering with authorization of and required permits from the NCRWQCB; and

- The SCWA shall comply with applicable permit conditions associated with the treatment of groundwater prior to discharge.

Impact after Mitigation: Less than Significant. With implementation of the above-referenced measures, residual impacts are expected to be less than significant.

Impact HWQ-3: NSCARP would increase the amount of impervious surfaces that in turn would alter the drainage pattern or increase local storm runoff volumes that could exceed the capacity of onsite drainage systems. This could cause localized flooding or contribute to a cumulate flooding impact downstream.

Discussion:

Pump Stations. Construction of NSCARP could alter local drainage patterns and runoff rates in the vicinity of project facilities. Construction of impervious surfaces could result in an increase in the rate and volume of surface runoff, potentially contributing to downstream flood impacts. Increases in impervious surface would be limited to above ground facilities consisting of a total of 16 booster and distribution pump stations as shown below (Table 3.8-4):

Table 3.8-4. Alternative 2 – Pump Stations' Impervious Surface Area

Subarea	Type of Pump Station	# Pump Stations	Total Impervious Surface Area (square feet)
Alexander Valley			
	Booster Pump Station	2	1,250
	Distribution Pump Station	1	2,500
Dry Creek			
	Booster Pump Station	2	1,250
	Distribution Pump Station	2	5,000
Russian River Valley			
	Booster Pump Station	1	625
	Distribution Pump Station	3	7,500
Northern Alexander Valley			
	Booster Pump Station	3	1,875
	Distribution Pump Station	2	5,000
Total		16	**25,000**

Development of the booster and distribution pump stations would involve paving and construction of building structures resulting in increases in impervious surface of approximately 25,000 square feet. The pump stations would include features, such as asphalt or concrete surfaces, rooftops, and other structures, that could prevent the natural drainage and infiltration of stormwater through the soil. However, the new impervious surfaces would not be as extensive as to cause significant changes in the downstream hydrology or flow rates.

Furthermore, the pump stations would designed to include appropriate drainage infrastructure to convey flows generated onsite and from upstream areas. Drainage designs would be integrated with existing drainage systems, and would be designed to avoid or minimize effects to downstream areas and infrastructure. Stormwater runoff from the pump stations would flow into a nearby ditch. Other measures to be implemented may include detention basins, vegetated swales, buffer strips, and/or infiltration basins. The measures and standard BMPs implemented would be consistent with the stormwater management plan. Therefore, potential drainage impacts from the pump stations would be less than significant, and no additional mitigation is required or recommended.

Pipelines. The recycled water pipelines would be buried underground or suspended across bridges. Following construction of the pipelines, the sites would be restored to pre-project conditions. There would be no new impervious surfaces and no change in storm runoff flows is expected.

Reservoirs. Construction of the operational and capacity storage reservoirs would change the reservoir site locations to open water (storage sites). Reservoir construction would involve substantial earthmoving activities to provide recycled water storage capacity. The reservoirs would utilize existing topography, providing the storage capacity by constructing earthen embankment dams or by excavating areas and compacting the earthen materials to form a continuous embankment around the reservoir. The reservoirs would be designed for the storage of recycled water combined with adequate freeboard to allow the storage of precipitation falling directly on the ponds. Natural stormwater runoff from upstream areas would be routed around the reservoirs and conveyed to downstream channels; thus, overall flow volumes downstream would likely be reduced as a result of the reservoir construction. The berms would be covered with soil and revegetated with grass; therefore, impervious areas would be limited. Potential impacts to drainage and flooding conditions that would result from the reservoirs would be less than significant and no additional mitigation is required.

Impact Category: Less than Significant

CEQA Threshold of Significance Criteria: 5, 6

Mitigation Measure: None required.

Impact HWQ-4: Operation of NSCARP has the potential to degrade groundwater quality and alter groundwater flows (discussion of potential public health and safety impacts are discussed in Section 3.12 “Public Health and Safety”).

Discussion: The NSCARP would provide recycled water for agricultural irrigation in the Alexander Valley, Dry Creek Valley and Russian River Valley. Some of this area is currently uncultivated. Conversion of the land from uncultivated to cultivated uses (such as vineyards or row crops) could increase the potential for runoff during irrigation and stormwater events, which in turn could lead to possible stream bank erosion.

Agricultural irrigation could result in minor increases in the salinity of groundwater, which measures as TDS. Based on the quality of the recycled water, the potential for changes in salinity is minor and would not be expected to impair the beneficial uses of groundwater. The California State Water Code states that minor changes in salinity associated with recycled water projects are acceptable. Accidental runoff or ponding from agricultural irrigation would be a temporary event that would have a less than significant impact on the quality of groundwater. Nitrate levels in recycled water, applied in accordance with accepted irrigation practices, are below the nitrate requirements of crops. Therefore, nitrate in recycled water would be almost entirely taken up by vegetation with minimal migration beyond the root zone. Although small amounts of nitrate could migrate through the root zone and enter the groundwater, the total input of nitrate to the groundwater would not be expected to measurably elevate nitrate levels.

Recycled water stored in the reservoirs could infiltrate into the groundwater and result in a degradation of groundwater quality and alteration in groundwater flows. The reservoirs would be compacted at the bottom and lined using a clay liner, if required. The clay lining would have a low permeability allowing for only minor infiltration of stored water to maximize the efficiency of the reservoir and prevent degradation of ground water. Infiltration is expected to occur only at the beginning when the reservoir is brought into operation. In the long-term, the downward seepage of the stored water would saturate the clay lining and prevent more water from seeping below. The amount of recycled water that might infiltrate to subsurface levels and affect the groundwater flow patterns or quality should be negligible, particularly when compared to the overall groundwater in the NSCARP area.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 3

Mitigation Measure HWQ-4: Following construction, the SCWA shall implement a groundwater monitoring program. If groundwater monitoring finds that levels have exceeded established MCLs at storage reservoirs, the SCWA shall investigate the integrity of the clay liner(s) to determine whether any repairs area necessary.

Impact After Mitigation: Less than Significant. Following construction, the SCWA shall implement a groundwater monitoring program. If groundwater monitoring finds that levels have exceeded established MCLs at storage reservoirs, the SCWA shall investigate the integrity of the clay liner(s) to determine whether any repairs area necessary.

Impact HWQ-5: During the winter months, high seasonal groundwater could intercept the bottom of the proposed reservoirs and possibly rise to a depth above the bottom of the reservoir. The pressure of groundwater could compromise the structural integrity of the reservoirs.

Discussion: In some wet years, groundwater could rise to shallow depths, possibly rising above the bottom of the reservoirs. If the water table is higher than the bottom of the reservoir, the groundwater could exert hydrostatic pressures that could warp or rip any liner material, damage the water conveyance system, and initiate sloughing of the banks. Although the adverse effects associated with high groundwater can be detrimental to operation of the reservoirs, the impact would not be significant. However, the effects of high groundwater would be localized operational nuisances that may cause temporary service delays during repair periods. The seasonal groundwater fluctuations and the effect on reservoir liners would need to be considered in the final design of the reservoirs. The seasonal behavior of groundwater would require specific designs and controls to eliminate the potential for damage to the reservoirs.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 3

Mitigation Measure HWQ-5: If determined necessary, the SCWA shall construct the reservoirs with clay liners, which should not be affected by high groundwater levels. Following construction, the SCWA shall regularly monitor the reservoirs to determine whether there is any adverse effect to the reservoir liners. If necessary, the SCWA shall make necessary repairs.

Impact after Mitigation: Less than Significant. With implementation of the above-referenced measure, residual impacts to the integrity of the reservoirs are expected to be less than significant.

Impact HWQ-6: NSCARP could expose people or property to risks related to flooding.

Discussion: There would be no danger of flooding due to agricultural irrigation even from an accidental release because the volumes of water that could be released from an irrigation pipe (0.1 cfs or 34,000 gallons in a twelve-hour period) would be too small to produce flooding. Furthermore, irrigators would be required to avoid over-application of recycled water to avoid direct runoff.

The only facility impacted by a pipeline rupture would be the road in which it is located. In the event of an earthquake, the primary impact on the road would be rupture rather than a pipeline break.

The reservoirs would be constructed primarily in hillside areas. Reservoirs would be created by damming a natural drainage or valley by means of an earth-filled embankment dam. Some reservoirs would include a smaller back/dam or saddle dams that would isolate a portion of the drainage area or adjoining drainage areas from the reservoir. The California Department of Water Resources, Division of Safety of Dams (DOSD) oversees the construction of dams that are over 25 feet high and impound over 15 acre-feet of water, or over six feet high and impound over 50 acre-feet of water. The reservoirs would be designed to withstand the effects of expected seismic events, the secondary ground failures associated with ground shaking, a flood event, unstable slope conditions, or damage from corrosive or expansive soils.

General reservoir design includes facilities to divert local runoff around the reservoir. These diversion channels would be constructed to minimize erosion. Reservoirs in both hillside and level sites would be outside the 100-year flood plain and thus would not displace flood capacity.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 9

Mitigation Measure HWQ-6:

A. The SCWA shall adhere to the standards set by the California Department of Water Resources Division of Safety of Dams in the design and construction of the dams and berms for the reservoirs. The Division of Safety of Dams believes that adherence to these design and construction standards greatly reduces the probability of dam failure and is protective of public safety (Head 1996); and,

B. During operation, the SCWA shall visually inspect the reservoirs on a regular basis to ensure that the embankments, control structures, access roads, and monitoring instrumentation are maintained. SCWA shall remove, if found, any impediments from the spillways and other control structures as soon as they are observed.

Impact After Mitigation: Less than Significant. With implementation of the above-referenced measures, residual impacts are expected to be less than significant.

Impact HWQ-7: NSCARP would increase summer flows in the tributaries of the Russian River and help maintain storage levels in Lake Mendocino, which would improve habitat for fish.

Discussion: The purpose of NSCARP is to provide recycled water for irrigation of agriculture in compliance with federal and state regulations, including DHS requirements listed under Title 22. Provision of this recycled water would offset use of surface water supplies, which would increase summer flows in the tributaries of the Russian River. In addition, reduced agricultural diversions from the Russian River would help maintain storage levels in Lake Mendocino and Sonoma, resulting in more water being available that can be released in the fall to assist with Chinook salmon upstream migration.

NSCARP would result in fewer agricultural diversions from the Russian River and its tributaries, which would enable the SCWA to release less water from storage in Lake Mendocino and Sonoma to meet water demands and instream flow requirements. This would result in more water being conserved in storage in these reservoirs, which would provide more operational flexibility for the SCWA to benefit fisheries sources in the Russian River. The increased operational flexibility would not result in additional water being available for other uses because existing reservoir storage capacity and water right flow requirements would not change.

Impact Category: Beneficial Effect

CEQA Threshold of Significance Criterion: 1

Mitigation Measure: None required

Impact HWQ-8: NSCARP could potentially cause groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment.

Discussion: It is unlikely that accidental ponding or runoff from agricultural irrigation would be sufficient in quantity or duration to cause groundwater mounding, because agricultural irrigation would likely occur during the spring and summer months when evaporation and evapotranspiration from plants is at a maximum. Groundwater levels may rise in areas where pumping from wells for agricultural irrigation is reduced or eliminated because recycled water has been substituted for groundwater. However, there remains a low probability that impacts would result in mounding in existing irrigation areas that are currently being irrigated with other water sources or in areas where drip irrigation systems are in use.

Neither construction nor operation of pipelines would cause mounding; however, pipeline failure could result in the rapid release of water. Water released by this mechanism would primarily flow overland or in channels as surface water. Because this event would be a rapid, one time release, little or no infiltration to groundwater would be expected. Mounding of the groundwater as a result of leakage from the pipeline during its operation is also not anticipated because the pipeline would be integrity tested to verify that it would not leak prior to its operation.

Because the reservoir sites could be located in areas where higher groundwater levels are present, there exists a low to moderate probability of mounding at some reservoirs. Mounding would not be expected beyond 100 to 200 feet from the reservoir site.

I**mpact Category:** Less than Significant

CEQA Threshold of Significance Criterion: 5

Mitigation Measure: None required

Impact HWQ-9: Operation of NSCARP could result in indirect/direct discharge or dam seepage that result in potential water quality impacts

Discussion: Implementation of Mitigation Measure HWQ-8 would minimize any potential for runoff from the NSCARP system. Any indirect discharge from agricultural irrigation with recycled water would be minimized because the application rate would be limited to the equivalent crop demand. Under normal operating conditions, the recycled water pipeline would not have water quality impacts because water would be completely contained within the pipeline and no discharge would occur. Short pipeline ruptures could introduce recycled water into a waterway; however, the quantity of water that may be released from a pipeline rupture would be limited by the closure of isolation valves on both sides within minutes of detected pressure drop.

With respect to damage seepage, during a large storm event, surface waters would be directed into spillways intended to provide for emergency release of water only in the event the reservoir is full. Spills could occur during rare and very large storm events; however, dilution of recycled water within the reservoir and dilution of spill in the receiving waters would be high; therefore no significant impact is expected. Furthermore, the duration and magnitude of a spill would be limited; therefore, water quality impacts to surface waters due to dam seepage would be less than significant.

.**Impact Category:** Significant but Mitigable

CEQA Threshold of Significance Criterion: 6

Mitigation Measure HWQ-9: The SCWA shall incorporate the following standard engineering mitigation measures into the final design of the pipelines to minimize the effects of pipeline ruptures:

- Flexible joints
- Welded joints
- Pressure sensors
- Visual inspection

Impact after Mitigation: Less than Significant. With implementation of the above-referenced measures, residual impacts are expected to be less than significant.

Alternative 3 - Alexander Valley-Jordan Reservoir Subset

This alternative represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C Reservoirs. Also, there would only be a total of 88,176 lineal feet of pipeline constructed; only one creek/river crossing (Russian River); no booster or distribution pump stations; and only irrigation of 3,492 acres. Potentially significant impacts would be similar to Alternative 2. As such, impacts related to water quality and hydrology could still potentially occur, but would impact a smaller geographic area; therefore, mitigation measures being applied to Alternative 2 would be implemented for Alternative 3 to lessen impacts to water quality and hydrology to a less than significant level. Beneficial effects to the Russian River and its tributaries from the increase in surface water flows would be less under Alternative 3 than Alternative 2.

Alternative 4 - Russian River-Westside Subset

This alternative represents a scaled-down version of the Russian River Valley subarea by limiting storage reservoir development to Russell, Russell-Bucher, Becnel and Gallo Twin Valley Reservoirs. Also, there would only be a total of 58,608 lineal feet of pipeline constructed; only one creek/river crossing (Russian River); only one booster pump station and two distribution pump stations; and only irrigation of 2,115 acres. Potentially significant impacts would be similar to Alternative 2. As such, impacts related to water quality and hydrology could still potentially occur, but would impact a smaller geographic area; therefore, mitigation measures being applied to Alternative 2 would be implemented for Alternative 4 to lessen impacts to water quality and hydrology to a less than significant level. Beneficial effects to the Russian River and its tributaries from the increase in surface water flows would be less under Alternative 3 than Alternative 2.

3.9 LAND USE/POLICY CONSISTENCY

This section considers potential conflicts of the NSCARP with existing land uses and zoning and the project's consistency with applicable land use and related plans. The section also discusses impacts on public open space. As a basis for this evaluation, the setting section provides information on regional land use patterns and General Plans of the jurisdictions within the study area.

3.9.1 Adopted Plans and Policies Governing the Area

The Sonoma County General Plan (1989, revised in 1994) is applicable to the unincorporated areas of Sonoma County and serves to guide decisions regarding future growth, development, and resource conservation. The General Plan divides the County into nine Planning Areas (also termed Sub-county Planning Regions) each with its own goals, objectives, and policies. The NSCARP area includes portions of the following County Planning Areas: Cloverdale/Northeast County, Healdsburg and Environs, Russian River Area, and Santa Rosa and Environs. Figure 3.9-1 shows Sonoma County General Plan land use designations for the project area,

Cloverdale/Northeast County Planning Area

The Cloverdale/Northeast County Planning Area includes the City of Cloverdale and the community of Geyserville. Though Cloverdale is located west and north of the NSCARP boundary, Geyserville is located within the NSCARP limits. The planning area includes the Russian River, Dry Creek, and Alexander valleys and is bounded by the Mendocino Highlands on the west and the Mayacamas Mountains on the east. Local resources include geothermal steam, construction aggregates, and water for domestic and agricultural use. The Northern Alexander Valley and the eastern portion of the Alexander Valley Subarea of the NSCARP are included in this Planning Area.

The County's General Plan (Sonoma County, 1989) identifies various objectives of the County and its residents for the Cloverdale/Northeast County Planning Area, and defines specific policies and associated actions intended to serve in meeting those objectives. Table 3.9-1 identifies one objective and one policy of the General Plan that have been identified through this assessment of having potential applicability to the NSCARP. Table 3.9-1 also provides a summary assessment of the NSCARP's consistency with the objective and policy identified.

Healdsburg and Environs Planning Area

The Healdsburg and Environs Planning Area is located in north central Sonoma County. The Russian River Basin located centrally in the Planning Area is known for its wine productions and is also used for gravel mining and recreation. Access to the Mendocino Highlands on the west is limited; therefore, the hillsides are primarily used as grazing lands. The Dry Creek Valley portion of the NSCARP and the majority of the Russian River Valley (northern portion) of the NSCARP are located within this Planning Area.

The Planning Area provides various agricultural, resource, scenic, and recreational values. Within the Planning Area, potential land use conflicts exist due to potential urban and visitor serving development opportunities in physically constrained areas with limited services while protecting agricultural and resource lands.

The County's General Plan (Sonoma County, 1989) identifies various objectives of the County and its residents for the Healdsburg and Environs Planning Area, and defines specific policies and associated actions intended to serve in meeting those objectives. No goals, objective, and/or policies of the General Plan have been identified through this assessment of having potential applicability to the NSCARP.

Russian River Planning Area

The Russian River Planning Area is centrally located within the County and is approximately five miles southwest of Healdsburg. The Russian River and redwoods provide the setting for extensive recreational activities. The redwoods are also a valuable natural resource. Apple orchards and vineyards are the chief agricultural enterprise within the Planning Area. The southern portion of the Russian River Valley of the NSCARP is located within this Planning Area.

The County's General Plan (Sonoma County, 1989) identifies various objectives of the County and its residents for the Russian River Planning Area, and defines specific policies and associated actions intended to serve in meeting these objectives. Table 3.9-1 identifies one objective and one policy of the General Plan that have been identified through this assessment of having potential applicability to the NSCARP.

Santa Rosa and Environs Planning Area

The Santa Rosa and Environs Planning Area consists of the Santa Rosa Plain as well as small valleys flanked by the mountainous areas of the Sonoma and Mayacamas ranges. According to the 1989 Sonoma County General Plan, the majority of the planning area's population lives in urban areas along U.S. Highway 101 and State Route 12, while rural residential development comprises the remainder of the area.

According to the County General Plan, more than half of the County's jobs are located in the Santa Rosa and Environs Planning Area. Many of these workers commute from other regions of the County. Unlike the other planning areas within the NSCARP area, agriculture is not the primary economic force in the Santa Rosa and Environs Planning Area; however, vineyards and grazing, and dairy operations do exist within this planning area.

The County's General Plan (Sonoma County, 1989) identifies various objectives of the County and its residents for the Santa Rosa and Environs Planning Area, and defines specific policies and associated actions intended to serve in meeting those objectives. No goals, objective, and/or policies of the General Plan have been identified through this assessment of having potential applicability to the NSCARP.

Figure 3.9-1. Land Use in the NSCARP Area

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Table 3.9-1. Applicable Objectives and Policy of the Sonoma County General Plan (Cloverdale/Northeast County Planning Area and Russian River Planning Area) and Assessment of Project Consistency

Objective/Policy	Project Consistency
LAND USE (Cloverdale/Northeast County Planning Area)	
Objective LU-11.1: Retain agricultural lands in Dry Creek, Alexander, Oat and Knights valleys in agricultural production.	**The project would be consistent with this objective.** Agricultural lands will be retained in the Dry Creek and Alexander valleys, while Oat and Knights valleys are outside of the project area.
LAND USE (Russian River Planning Area)	
Policy LU-13f: Require building envelopes on all tentative subdivision maps which minimize damage to redwood trees and which protect the redwood ecosystem. Show on the map the precise location of any redwood trees within the building envelope which are greater than two feet in diameter at four feet above the ground.	**The project would be consistent with this policy.** Though the project does not involve tentative subdivision maps, redwood trees would be protected to the greatest extent possible. Before project construction, the project team would identify any redwood trees greater than two feet in diameter at four feet above the ground potentially impacted by the proposed project. Any redwood tree loss would be mitigated.

Source: Sonoma County General Plan, 1989

Study Area Land Use

Existing land use patterns in the NSCARP area are generally characterized by areas of agricultural use. Agriculture is an important land use in the NSCARP area, with a diversity of agricultural operations, including vineyards, orchards, dairies, forage crops, specialty crops, and livestock. The primary land use designation for the NSCARP site listed in the *1989 Sonoma County General Plan* is Land Intensive Agricultural. Additional land use designations within the proposed NSCARP service area boundaries include Land Extensive Agriculture, Diverse Agriculture, Resources and Rural Development, Rural Residential, Limited Industrial, and Public/Quasi-Public. Figure 3.9-1 shows Sonoma County General Plan land use designations for the project area, and each of these designations is described in Table 3.9-2, as defined in the County's General Plan. The proposed water supply pipeline would be located directly adjacent to or within parcels with the land use designations described in Table 3.9-2.

Note that Figure 3.9-1 shows two City of Healdsburg parcels and one Town of Windsor parcel within the NSCARP area. The northernmost parcel (shown in turquoise) is the Healdsburg Animal Shelter, located at 570 Westside Road. Moving south on the figure, the next parcel is the City of Healdsburg Wastewater Treatment Facility, while the southernmost parcel is the Town of Windsor's Russian River Well Lands. The Windsor's Russian River Well Lands provide the Town's water source. Though the three parcels are within the NSCARP area, placement and/or installation of proposed features (i.e., pipeline, reservoirs, or pump stations) on the parcels would not occur. The two City parcels are designated public/quasi-public in the City of Healdsburg General Plan and the Town of Windsor's Russian River Well Lands parcel is designated as Resources and Rural Development on the Sonoma County General Plan Land Use map, and would not utilize recycled water for agricultural irrigation uses, store recycled water on-site for agricultural irrigation purposes, or maintain pumping stations within the parcel boundaries.

Table 3.9-2. Sonoma County Land Use Designation Descriptions

Designation	Description
Land Intensive Agriculture	This category shall enhance and protect lands capable of and generally used for the production of food, fiber, and plant materials. The soil type and climate support relatively high production per acre of land. The objective in land intensive agricultural areas shall be to establish densities and parcel sizes which are conducive to continued agricultural production. Permitted uses in this designation include agricultural production, agricultural processing, agricultural services, tasting rooms and agricultural-products stands, agricultural employee housing, surface mining, and community service facilities.
Land Extensive Agriculture	This category shall enhance and protect lands capable of and generally used for the production of food, fiber, and plant materials. Soil and climate conditions typically result in relatively low production per acre of land. The objective in land extensive agricultural areas shall be to establish and maintain densities and parcel sizes which are conducive to continued agricultural production. Permitted uses in this designation include agricultural production, agricultural processing, agricultural services, tasting rooms and agricultural-products stands, agricultural employee housing, surface mining, and community service facilities.
Diverse Agriculture	This category shall enhance and protect those land areas where soil, climate, and water conditions support farming but where small acreage intensive farming and part time farming activities are predominant. In these areas, farming may not be the principal occupation of the farmer. The primary purpose of this category is to protect a full range of agricultural uses and to limit further residential intrusion consistent with the policies of the Agricultural Resources Element. Permitted uses in this designation include agricultural production, agricultural processing, agricultural services, tasting rooms and agricultural-products stands, agricultural employee housing, surface mining, and community service facilities.
Resources and Rural Development	This category allows very low density residential development and also is intended to: 1. Protect land needed for commercial timber production under the California Timberland Activity Act. 2. Protect lands within the Known Geothermal Resource Area (KGRA). 3. Protect lands for aggregate resource production as identified in the Aggregate Resources Management Plan. 4. Protect natural resource lands including, but not limited to watershed, fish and wildlife habitat and biotic areas. 5. Protect against intensive development of lands constrained by geologic hazards, steep slopes, poor soils or water, fire and flood prone areas, biotic and scenic areas, and other constraints. 6. Protect lands needed for agricultural production activities that are not subject to all of the policies of the Agricultural Resource Element. 7. Protection of County residents from proliferation of growth in areas in which there are inadequate public services and infrastructure. It is further the intent of this category that public services and facilities not be extensively provided in these areas and that development have the minimum adverse impact on the environment. Permitted uses in this designation include single family dwellings, resource management, livestock farming, crop production, firewood harvesting, campgrounds, and resource-related employee housing.

Table 3.9-2. Sonoma County Land Use Designation Descriptions (Continued)

Designation	Description
Rural Residential	This category provides for very low density residential development on lands which have few if any urban services but which have access to county maintained roads. The primary use in this designation is detached single family homes, with secondary uses including attached dwellings, farming, small scale animal husbandry, home occupations, small scale home care and group care facilities, public and private schools and churches, and other uses incidental to and compatible with the primary use.
Limited Industrial	The "Limited Industrial" land use category provides sites for development to meet service and employment needs where the range or scale of industrial uses is limited. Factors which may limit these uses are lack of public services, incompatible adjacent land uses, and adverse environmental impacts. Industrial parks are included in this category as well as land extensive industrial development. Permitted uses in this designation include resource related industrial uses not expected to need the full range of urban services, such as lumber mills and concrete and asphalt plants.
Public/Quasi-Public	This category provides sites which serve the community or public need and are owned or operated by government agencies, non profit entities, or public utilities. Permitted uses in this designation include schools, churches, libraries, governmental administration centers, fire stations, cemeteries, airports, hospitals, sewage treatment plants, waste disposal sites, etc.

Source: Sonoma County General Plan, Land Use Element, 1989

Russian River Valley

The Russian River Valley extends along the Russian River from Mirabel to Alexander Valley Road, just north of Healdsburg. Windsor and Healdsburg, both of which are outside of the NSCARP area, are two main urban centers in the area, located along the U.S. Highway 101 corridor in the Russian River area. Rural lands outside of the valley floors and lower foothills are relatively inaccessible and sparsely populated. Land along the Russian River is predominantly agricultural with a combination of viticulture, row crops, and grazing. There are scattered residences in the area generally associated with the agricultural operations.

Alexander Valley

The Alexander Valley includes the Russian River and extends from Healdsburg to Oat Valley, just north of Cloverdale. The Mayacamas Range creates the eastern boundary and the Mendocino Highlands border to the north and west. Existing land uses in this area are predominantly agricultural, but rural residential areas are found on the western hillsides of Cloverdale.

Dry Creek Valley

The Dry Creek Valley extends north from Healdsburg to Lake Sonoma, which provides many recreational opportunities. Lands outside of the valley floor are severely constrained and relatively inaccessible. Existing uses in the valley are primarily agricultural, with a preponderance of viticulture. The land use designation in the area on either side of Dry Creek is Land Intensive Agriculture.

3.9.2 Regulatory Setting

Local Jurisdiction Regulation

The Sonoma County General Plan (Sonoma County, 1989) identifies various goals of the County and its residents, and defines specific objectives and policies intended to serve in meeting those goals. Table 3.9-3 identifies select goals, objectives, and policies of the General Plan that have been identified through this assessment of having potential applicability to the NSCARP. Table 3.9-3 also provides a summary assessment of the NSCARP's consistency with each goal, objective, and policy identified. In instances where potential inconstancies exist between the NSCARP and general plan goals/policies, the table provides a reference in *italicized* text to the specific discussion in this EIR/EIS where more detailed consideration of the potential inconsistency is provided. (Note that the goals, objectives, and policies identified in Table 3.9-3 are listed in the order the applicable resource section is found in this EIR/EIS. The Sonoma County General Plan did not contain any applicable goals, objectives, and/or policies for the Environmental Justice and Population/Housing evaluations.

Table 3.9-3. Applicable Goals, Objectives, and Policies of the Sonoma County General Plan and Assessment of Project Consistency

Policy	Project Consistency
AESTHETIC RESOURCES	
Goal OS-1: Preserve the visual identities of communities by maintaining open space areas between cities and communities.	**The project would be consistent with this goal.** Open space areas between cities and communities would remain open, and no view obstructing structures would be placed in the community separating areas.
Objective OS-1.1: Preserve important open space areas in the community separators shown on Figures OS-5a through OS-5i of the Open Space Element.	**The project would be consistent with this objective.** Open space areas between cities and communities would remain open, and no view obstructing structures would be placed in the community separating areas.
Objective OS-1.2: Retain a rural character and promote low intensities of development in community separators. Avoid their annexation or inclusion in spheres of influence for sewer and water service providers.	**The project would be consistent with this objective.** The rural character of the project area would remain open within the open space areas between cities and communities, and no view obstructing structures would be placed in the community separating areas.
Objective OS-1.4: Preserve existing specimen trees and tree stands within community separator areas.	**The project has the potential to conflict with this objective.** The project may require the removal of trees or tree stands within community separator areas; however, the project would retain trees and tree stands, where feasible. *See Section 3.4_ for further discussion of potential tree removal.*
Policy OS-1b: Avoid commercial or industrial uses in community separators other than those which are permitted by the agricultural or resource land use categories, except as may be authorized by policy OS-1c below. Consider amendments for outdoor recreational or other uses with a low intensity of structures only in those community separators along the Highway 101 Corridor.	**The project would be consistent with this policy.** The placement of reservoirs on agricultural lands are permitted with the issue of use permits.

Table 3.9-3. (Continued)

Policy	Project Consistency
Policy OS-1e: Require that new structures meet the following criteria: They are sited below exposed ridgelines. They use natural landforms and existing vegetation to screen them from view from public roads. On exposed sites, screening with native, fire retardant plants may be required. Cuts and fills are discouraged and where practical, driveways are screened from public view. Utilities are undergrounded where economically practical. Exempt agricultural accessory structures from this policy if their use does not require a use permit in the zoning ordinance. If compliance with these standards would make a parcel unbuildable, site structures where minimum visual impacts would result. Exempt telecommunication facilities if they meet the siting and design criteria of the Scenic Resources (SR) Zoning District.	**The project would be consistent with this policy.** Pumping stations would be sited below exposed ridgelines. Pumping stations would be screened with vegetation and painted so as to blend with their surroundings. Cuts and fills would be minimized for the proposed project, and no permanent driveways are proposed for the project, though temporary access may be developed for certain construction activities. Proposed pipelines would be located underground and would not permanently obstruct views.
Goal OS-2: Retain the largely open, scenic character of important scenic landscape units.	**The project would be consistent with this goal.** Proposed pipelines would be located underground and would not permanently obstruct views. Proposed pumping stations would be screened with vegetation and painted so as to blend with their surroundings. Proposed reservoirs would be situated in valleys, and would be shielded from view by substantial numbers of potential viewers. Temporarily disturbed sites would be revegetated and landforms along the routes would be restored and blended with the natural landforms.
Objective OS-2.1: Retain a rural, scenic character in scenic landscape units with very low intensities of development. Avoid their inclusion within spheres of influence for public service providers.	**The project would be consistent with this objective.** The rural character of the project area would remain open within the scenic landscape units. The project would not require an increase in public service.
Policy OS-2b: Avoid commercial or industrial uses in scenic landscape units other than those which are permitted by the agricultural or resource land use categories.	**The project would be consistent with this policy.** The placement of reservoirs on agricultural lands are permitted with the issue of use permits.
Policy OS-2e: Require that new structures meet the following criteria: They are sited below exposed ridgelines They use natural landforms and existing vegetation to screen them from view from public roads. On exposed sited, screening with native, fire retardant plants may be required. Cuts and fills are discouraged and where practical, driveways are screened from public view. Utilities are undergrounded where economically practical.	**The project would be consistent with this policy.** Pumping stations would be sited below exposed ridgelines. Pumping stations would be screened with vegetation and painted so as to blend with their surroundings. Cuts and fills would be minimized for the proposed project, and no driveways are proposed for the project. Proposed pipelines would be located underground and would not permanently obstruct views.

Table 3.9-3. (Continued)

Policy	Project Consistency
Exempt agricultural accessory structures from this policy if their use does not require a use permit in the zoning ordinance. If compliance with these standards would make a parcel unbuildable, site structure where minimum visual impacts would result. Exempt telecommunication facilities if they meet the siting and design criteria of the Scenic Resources (SR) Zoning District	
Goal OS-3: Identify and preserve roadside landscapes which have a high visual quality as they contribute to the living environment of local residents and to the county's tourism economy.	**The project would be consistent with this goal.** Proposed pipelines would be located underground and would not permanently obstruct views. Proposed pumping stations would be screened with vegetation and painted so as to blend with their surroundings. Proposed reservoirs would be situated in valleys, and would be shielded from view by substantial numbers of potential viewers. Temporarily disturbed sites would be revegetated and landforms along the routes would be restored to blend with the natural landforms.
Policy OS-3h: Design public works projects to minimize tree damage and removal along scenic corridors. Where trees must be removed, design replanting programs so as to accommodate ultimate planned highway improvements. Require revegetation following grading and road cuts.	**The project would be consistent with this policy.** Areas disturbed by construction activities would be revegetated and landforms along the routes would be restored to blend with the natural landforms. The project may require the removal of trees or tree stands visible from scenic corridors; however, the project would retain trees and tree stands, where feasible. See Section 3.4 for further discussion of potential tree removal.
AGRICULTURAL RESOURCES	
Goal AR-3: Maintain the maximum amount of land in parcel sizes that a farmer would be willing to lease or buy for agricultural purposes.	**The project would be consistent with this goal.** The proposed project would not require the subdivision of parcels and would retain existing parcel sizes.
Objective AR-3.2: Maintain, in those agricultural land use categories where small parcels may be permitted, the largest land area for agricultural use. Limit the number of clustered lots in any one area to avoid the potential conflicts associated with residential intrusion.	**The project would be consistent with this objective.** The proposed project would not require the subdivision of parcels and would retain existing parcel sizes.
Policy AR-5c: Only permit agricultural support service uses that clearly support local agricultural production consistent with the specific requirements of each of the three agricultural land use categories. Insure that such uses are clearly subordinate to on-site agricultural production and do not adversely affect agricultural production in the area. Establish standards and procedures for those uses in the zoning ordinance.	**The project would be consistent with this policy.** Proposed Project components occupying greater than 0.5-acres (such as proposed or expanded reservoirs) would clearly support agricultural production in the project area, as they would provide storage for an alternative source of irrigation water.
Policy AR-5d: Use the following guidelines for approving zoning or permits for agricultural support services: 1) The use will not require the extension of sewer or water. 2) The use does not substantially detract from agricultural production on-site or in the area.	**The project would be consistent with this policy.** Project components would not require the extension of sewer or (potable) water, would not substantially detract from agricultural production, do not include commercial uses, and proposed project components would not be located in the vicinity of residential neighborhoods or on lands designated as Low-, Medium-, or High-Density Residential.

Table 3.9-3. (Continued)

Policy	Project Consistency
3) The use does not create a concentration of commercial uses in the immediate area. 4) The use is compatible with and does not adversely impact surrounding residential neighborhoods.	
Objective AR-8.1: Continue participation in the Williamson Act program.	**The project would be inconsistent with this objective.** The proposed project would not require the subdivision of parcels currently participating in Williamson Act contracts; however, the proposed project would require the purchase of parcels or portions of parcels currently participating in Williamson Act contracts, which may result in the cancellation of such contracts. See Section 3.2 for further discussion.
Objective AR-8.2: Participate with wastewater generators to establish programs for agricultural reuse of treated wastewater in a manner which would be economically beneficial to agriculture.	**The project would be consistent with this objective.** The NSCARP proposes to develop a system for the storage and distribution of recycled water for agricultural reuse.
Policy AR-8f: Encourage participation in programs for reuse of treated wastewater, including the establishment of wastewater irrigation districts.	**The project would be consistent with this policy.** The NSCARP proposes to develop a system for the storage and distribution of recycled water for agricultural reuse.
Goal RC-1: Encourage the conservation of soil resources to protect their long term productivity and economic value.	**The project would be consistent with this goal.** Recycled water quality data presented in Section 3.2 indicates soil productivity would not be impacted as a result of irrigation with recycled water.
Objective RC-1.1: Preserve lands containing prime agricultural and productive woodland soils and avoid their conversion to incompatible residential, commercial or industrial uses.	**The project would be consistent with this objective.** The proposed project would not require the conversion of agricultural lands to an incompatible land use.
AIR QUALITY	
Goal RC-13: Preserve and maintain good air quality and provide for an air quality standard that will protect human health and preclude crop, plant and property damage in accordance with the requirements of the Federal and State Clean Air Acts.	**The project would be consistent with this goal.** Dust control measures (as identified in the Dust Suppression Plan) would be implemented to minimize impacts to air quality and to ensure compliance with the Federal and State Clean Air Acts.
Objective RC-13.1: Maintain the projected county air quality as set forth in the Final Environmental Impact Report and minimize air pollution.	**The project would be consistent with this objective.** *See Section 3.3.*
BIOLOGICAL RESOURCES	
Goal OS-4: Identify critical habitat areas and assure that the quality of these natural resources is maintained and not adversely affected by development activities.	**The project would be consistent with this goal.** No critical habitat areas occur within the NSCARP project area. *See Section 3.4.*
Objective OS-4.1: Designate important wetlands, marshes and other critical habitats and maintain low intensity land uses in these areas.	**The project would be consistent with this goal.** Sensitive habitat features have been identified. Impacts to these areas will be avoided, minimized, and/or mitigated. *See Section 3.4.*
Policy OS-4c: Require the preparation of a biotic resource assessment to develop mitigation measures if the Planning Director determines that a discretionary project could adversely impact a designated critical habitat area.	**The project would be consistent with this goal.** Section 3.4 of this EIR/EIS fulfills the requirement. *See Section 3.4.*

Table 3.9-3. (Continued)

Policy	Project Consistency
Goal OS-5: Provide protective measures for riparian corridors along selected streams which balance the need for agricultural production, urban development, timber and mining operations, and flood control with preservation of riparian values.	**The project would be consistent with this goal.** Construction techniques, such as horizontal directional drilling, and mitigation measures will be implemented to protect riparian corridors. See Section 3.4.
Policy OS-5h: Use the following criteria to determine whether or not public projects are consistent with this element: 1) Non-emergency Water Agency projects which include significant streambank modification are not consistent. Refer plans for vegetation removal for maintenance purposes to the Department of Fish and Game (DFG) for review. 2) Roadway and utility construction should seek to minimize and mitigate, where feasible, damage to riparian areas. Minimize vegetation removal for necessary stream crossings. 3) All criteria established in policy OS-5f. 4) Grading, filling or construction shall not substantially diminish or divert any stream flow or result in any substantial increase in bank instability or erosion. In the event that the above criteria cannot be met, a public project may be found consistent with this element if there is an overriding net public benefit.	**The project would be consistent with this goal.** See Section 3.4.
Goal RC-5: Promote and maintain the County's diverse plant and animal communities and protect biotic resources from development activities.	**The project would be consistent with this goal.** Component siting will minimize the loss of wildlife habitat and wildlife resources to the extent practicable. Mitigation measures will be implemented to compensate for habitat losses See Section 3.4.
Objective RC-5.1: Identify and encourage protection of areas with important wildlife habitats and woodland resources.	**The project would be consistent with this goal.** Component siting will minimize the loss of wildlife habitat and wildlife resources to the extent practicable. Mitigation measures will be implemented to compensate for habitat losses. See Section 3.4.
Objective RC-5.2: Encourage the use of native plants in landscaping to reduce the risk of introducing exotic plant species into wildlife areas.	**The project would be consistent with this goal.** A Revegetation Plan will be prepared that will encourage use of native plant species and avoid the introduction of noxious weeds and other exotics. See Section 3.4.
Goal RC-6: Identify and protect rare and endangered species and their environment.	**The project would be consistent with this goal.** Pre-construction surveys will be conducted at each construction site to identify the location of special-status species. Measures will be implemented to avoid, minimization, or mitigation for impacts. See Section 3.4.
Objective RC-6.1: Identify the locations of rare and endangered plants and animals.	**The project would be consistent with this goal.** Pre-construction surveys will be conducted at each construction site to identify the location of special-status species. Measures will be implemented to avoid, minimization, or mitigation for impacts. See Section 3.4.
Objective RC-6.2: Require that any development on lands containing rare and endangered species be done in a manner which protects the resource or mitigates adverse impacts.	**The project would be consistent with this goal.** See Section 3.4.

Table 3.9-3. (Continued)

Policy	Project Consistency
Goal RC-8: Encourage effective management of freshwater fishery resources and balance competing agricultural, development, and mining needs with protection of the stream environment.	**The project would be consistent with this goal.** The project would utilize recycled water in order to reduce reliance of surface waters for agricultural irrigation. This will allow increased natural flows in area rivers. See Section 3.4.
CULTURAL RESOURCES	
Goal OS-9: Preserve significant archaeological and historical sites which represent the ethnic, cultural, and economic groups that have lived and worked in Sonoma County. Preserve unique or historically significant heritage or landmark trees.	**The project would be consistent with this goal.** The project has identified 40 prehistoric and historic sites within and/or adjacent to the project area and would preserve and avoid disturbance to such resources. The project may require the removal of trees or tree stands visible from scenic corridors; however, the project would be designed so as to retain heritage and landmark trees and tree stands, where feasible. *See Section 3.5 for further discussion of potential tree removal.*
Objective OS-9.3: Encourage preservation of archaeological resources by reviewing all development projects in archaeologically sensitive areas.	**The project would be consistent with this objective.** The project has identified 40 prehistoric and historic sites within and/or adjacent to the project area and would preserve and avoid disturbance to such resources.
Policy OS-9f: Refer applications for discretionary permits to the Northwest Information Center to determine if the project site might contain archaeological or historical resources. If a site is likely to have these resources, require a field survey and include mitigation measures if needed. Discourage paving over resources.	**The project would be consistent with this policy.** The Northwest Information Center was contacted to determine potential archaeological or historical resources within the project area. Field surveys were conducted by PMC archaeologists in 2005 and 2006. Project archaeologists identified 40 cultural resources within the project area; however, the project would be designed to preserve and avoid disturbance to such resources or shall implement appropriate mitigation measures to preserve and avoid disturbance to such resources.
GEOLOGY AND SOILS	
Goal PS-1: Prevent unnecessary exposure of people and property to risks of damage or injury from earthquakes, landslides and other geologic hazards.	**The project would be consistent with this goal.** Structures associated with the proposed project would be constructed according to state and local regulations and would not expose people or property to risks of damage or injury due to a geologic hazard.
Objective PS-1.1: Continue to utilize available data on geologic hazards and associated risks.	**The project would be consistent with this objective.** *Available data on geologic hazards and associated risks were consulted during the preparation of Section 3.7, Geology and Soils.*
Policy PS-1f: Require and review geologic reports prior to decisions on any project which would subject property or persons to significant risks from the geologic hazards shown on Figures PS-1a through PS-1i (pages 257 through 273) and related file maps and source documents. Geologic reports shall describe the hazards and include mitigation measures to reduce risks to acceptable levels. Where appropriate, require an engineer's or geologist's certification that risks have been mitigated to an acceptable level and, if indicated, obtain indemnification or insurance from the engineer, geologist, or developer to minimize County exposure to liability.	**The project would be consistent with this policy.** Mitigation Measure GEO-1 requires that a geologic study report be prepared for each reservoir site. Such report shall describe the hazards and include mitigation measures to reduce risks to acceptable levels. The design specifications for each reservoir site shall provide an engineer's or geologist's certification that risks have been mitigated to an acceptable level,

Table 3.9-3. (Continued)

Policy	Project Consistency
Policy PS-1j: Encourage strong enforcement of state seismic safety requirements for design and construction of dams, powerplants, hospitals and schools.	**The project would be consistent with this policy.** The project would comply with state seismic safety requirements for design and construction of dams associated with project reservoirs.
Policy PS-1k: Roads, public facilities and other County projects should incorporate measures to mitigate identified geologic hazards to acceptable levels.	**The project would be consistent with this policy.** Mitigation Measures GEO-1 and GEO-2 would reduce impacts to geologic hazard to less than significant.
Objective RC-2.1: Ensure that permitted uses are compatible with reducing potential damage due to soil erosion.	**The project would be consistent with this objective.** The proposed project would include preparation and implementation of an erosion control and restoration plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities.
Objective RC-2.2: Establish ways to prevent soil erosion and restore areas damaged by erosion.	**The project would be consistent with this objective.** Areas disturbed by construction activities would be revegetated and landforms along the routes would be restored to blend with the natural landforms. Additionally, the proposed project would include preparation and implementation of an Erosion and Sediment Control Plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities.
Policy RC-2b: Include erosion control measures for any discretionary project involving construction or grading near waterways or on lands with slopes over 10 percent.	**The project would be consistent with this policy.** The proposed project would include preparation and implementation of an Erosion and Sediment Control Plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities.
Policy RC-2d: Require a soil conservation program to reduce soil erosion impacts for discretionary projects which could increase waterway or hillside erosion. Design improvements such as roads and driveways to retain natural vegetation and topography to the extent feasible.	**The project would be consistent with this policy.** Areas disturbed by construction activities would be revegetated and landforms along the routes would be restored to blend with the natural landforms. The proposed project would include preparation and implementation of an Erosion and Sediment Control Plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities.
Policy RC-2e: Retain natural vegetation and topography to the extent economically feasible for any discretionary project improvements near waterways or in areas with a high risk of erosion as noted in the Sonoma County Soil Survey.	**The project would be consistent with this policy.** Areas disturbed by construction activities would be revegetated and landforms along the routes would be restored to blend with the natural landforms. The proposed project would include preparation and implementation of an Erosion and Sediment Control Plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities.

Table 3.9-3. (Continued)

Policy	Project Consistency
Policy RC-2f: Prepare and submit to the Board of Supervisors an erosion and sediment control report.	**The project would be consistent with this policy.** The proposed project would include preparation and implementation of an Erosion and Sediment Control Plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities.
Policy RC-2g: Continue to enforce the Uniform Building Code to reduce erosion and slope instability problems.	**The project would be consistent with this policy.** The project would be designed and constructed in accordance with requirements identified in the Uniform Building Code.
HYDROLOGY/WATER QUALITY	
Objective RC-3.1: Preserve watersheds and groundwater recharge areas by avoiding the placement of potential pollution sources in areas with high percolation rates.	**The project would be consistent with this objective.** The storage reservoirs would be lined with clay to prevent percolation.
Objective RC-3.3: Preserve and enhance the quality of surface and groundwater resources.	**The project would be consistent with this policy.** The Proposed Project is intended to offset use of surface water and groundwater resources. As discussed in Section 3.8, potential impacts to surface and groundwater resources would be minimized through implementation of Mitigation Measures HWQ-1, HWQ-2, HWQ-5, and HWQ-9.
Policy RC-3a: Grading, filling and construction should not substantially reduce or divert any stream flow that would affect groundwater recharge.	**The project would be consistent with this policy.** Mitigation Measure 3.8-6 requires that the SCWA monitor water quality and water levels in water wells potentially affected by NSCARP facilities before and after construction, as part of the SWPPP. If changes are detected after construction that are deemed deleterious to public health by the County of Sonoma Well and Septic Division staff or under applicable regulation, or if water level monitoring indicates that wells may become unproductive as a result of reduced upgradient inflows, the SCWA shall implement a Well Protection Plan. This plan would provide several optional ways to prevent deterioration of quality at drinking water wells including: Drilling a new well that is not significantly affected by the NSCARP facility; Modifying the existing well, e.g., provide screening in a different stratum, such that the existing well is not significantly affected by the NSCARP facilities; Providing wellhead treatment system for the constituents that are causing the public health concern; and/or, Providing replacement water supply
Policy RC-3d: Continue to encourage the construction of wastewater disposal systems designed to reclaim and reuse treated wastewater on agricultural crops, and for other irrigation and wildlife enhancement projects.	**The project would be consistent with this policy.** It involves the construction and operation of a system to store and distribute recycled water for irrigation of agricultural crops.

Table 3.9-3. (Continued)

Policy	Project Consistency
HYDROLOGY/WATER QUALITY	
Policy RC-3e: Encourage wastewater disposal methods which minimize reliance on discharges into natural waterways. If discharge is proposed, review and comment on projects and environmental documents and request that projects maximize reclamation, conservation and reuse programs to minimize discharges and protect water quality and aquifer recharge areas.	**The project would be consistent with this policy.** The project does not proposed discharges into natural waterways.
LAND USE	
Goal LU-5: Identify important open space areas between the county's cities and communities. Maintain them in a largely open or natural character with low intensities of development.	**The project would be consistent with this goal.** The natural character of the project area would remain open within the open space areas between cities and communities. The proposed project does not include high intensity development.
Objective LU-5.1: Retain low intensities of use in open space "separators" between cities and communities along the Highway 101 corridor and within the central Sonoma County area as shown on Figure LU-3 on page 39.	**The project would be consistent with this objective.** The project would not involve high intensity development, therefore, such development would not be placed in community separating areas between cities and communities.
Goal LU-7: Prevent unnecessary exposure of people and property to environmental risks and hazards. Limit development on lands that are especially vulnerable or sensitive to environmental damage.	**The project would be consistent with this goal.** Project components would be constructed outside of sensitive environmental areas, where feasible. Where construction in sensitive environmental areas cannot be avoided, impacts would be fully mitigated.
Goal LU-8: Protect lands currently in agricultural production and lands with soils and other characteristics which make them potentially suitable for agricultural use. Retain large parcel sizes and avoid incompatible non-agricultural uses.	**The project would be consistent with this goal.** The project does not propose the subdivision of any parcels and would not adversely impact soil productivity of lands irrigated with recycled water. See Section 3.2 for additional discussion of soil productivity as a result of irrigation of soils with recycled water.
Objective LU-8.4: Discourage uses in agricultural areas that are not compatible with long term agricultural production.	**The project would be consistent with this objective.** Recycled water quality data presented in Section 3.2 indicates long-term soil productivity would not be impacted as a result of irrigation with recycled water.
Objective LU-11.1: Retain agricultural lands in Dry Creek, Alexander, Oat and Knights Valleys in agricultural production.	**The project would be consistent with this objective.** Agricultural lands will be retained in the Dry Creek and Alexander Valleys, while Oat and Knights Valleys are outside of the project area.
Objective LU-15.4: Avoid conversion of agricultural lands to non-agricultural uses. Development shall be compatible with protection of agricultural lands and agricultural production.	**The project has the potential to be inconsistent with this objective.** The project would result in the loss of 342.3 acres of farmland, some of which are subject to Williamson Act Contracts. The lands acquired for pumping station construction and reservoir development would be utilized as agricultural support systems. Such uses would be consistent with lands designated as Land Intensive Agriculture with a use permit. See the discussion above for Policies AR-5c and AR-5d.

Table 3.9-3. (Continued)

Policy	Project Consistency
NOISE	
Goal NE-1: Protect people from the harmful effects of exposure to excessive noise and to achieve an environment in which people and land uses may function without impairment from noise.	**The project would be consistent with this goal.** Mitigation Measures NOI-1 through NOI-3 would minimize potential adverse noise effects.
Objective NE-1.1: Provide noise exposure information so that noise impacts may be effectively evaluated in land use planning and project review.	**The project would be consistent with this objective.** Section 3.11 thoroughly assesses potential impacts to noise that may result from construction and operation of NSCARP.
Objective NE-1.2: Develop and implement measures to avoid exposure of people to excessive noise levels.	**The project would be consistent with this objective.** Mitigation Measures NOI-1 through NOI-3 (in Section 3.10) would minimize potential adverse noise effects.
Objective NE-1.3: Protect the present noise environment and prevent intrusion of new noise sources which would substantially alter the noise environment.	**The project would be consistent with this objective.** Construction of the proposed project would result in temporary increases in ambient noise levels; however, operation of the proposed project would not substantially alter the noise environment.
Policy NE-1c: Control non transportation related noise from new projects. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table NE-2 as measured at the exterior property line of any affected residential land use. Limit exceptions to the following: If the ambient noise level exceeds the standard in Table NE-2, adjust the standard to equal the ambient level. Reduce the applicable standards in Table NE-2 by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. Reduce the applicable standards in Table NE-2 by 5 decibels if they exceed the ambient level by 10 or more decibels.	**The project would be consistent with this objective.** Mitigation Measures NOI-1 through NOI-3 (in Section 3.10) would minimize potential adverse noise effects.
Policy NE-1f: Require development projects which do not include or affect residential uses or other noise sensitive uses to include noise mitigation measures where necessary to maintain noise levels compatible with activities planned for the project site and vicinity.	**The project would be consistent with this policy.** Construction of the proposed project would result in temporary increases in ambient noise levels; however, operation of the proposed project would not substantially alter the noise environment. Mitigation Measures NOI-1 through NOI-3 (in Section 3.10) would minimize potential adverse noise effects.
POPULATION AND HOUSING	
Policy HE-2j: Working cooperatively with the County's cities, identify and comment on proposed general plan amendments and development projects that may improve or worsen the countywide jobs/housing balance.	**The project would be consistent with this policy.** Though the NSCARP does not propose housing, it is estimated that approximately 50 construction personnel and four operational employees would be utilized for the NSCARP. This increase in employment opportunities would not create a job/housing imbalance. See Section 3.11 for further discussion.

Table 3.9-3. (Continued)

Policy	Project Consistency
PUBLIC HEALTH AND SAFETY	
Goal PS-2.1: Prevent unnecessary exposure of people and property to risks of damage or injury from flooding.	**The project would be consistent with this goal.** The project proposes mitigation measures that would be implemented to reduce potential risks of damage or injury from flooding. See Section 3.8 for further discussion.
Policy PS-2f: On-site and off-site flood related hazards shall be reviewed for all projects located within areas subject to known flood hazards.	**The project would be consistent with this policy.** This EIR/EIS evaluates on- and off-site flooding associated with implementation of the proposed project. See Section 3.8 for further discussion.
Goal PS-3.1: Prevent unnecessary exposure of people and property to risks of damage or injury from wildland and structural fires.	**The project would be consistent with this goal.** The project proposes mitigation measures that would be implemented to reduce potential risks of damage or injury from wildland and structural fires. See Section 3.12 for further discussion.
Goal PS-4: Prevent unnecessary exposure of people and property to risks of damage or injury from hazardous materials.	**The project would be consistent with this goal.** The project proposes mitigation measures that would be implemented to reduce potential risks of damage or injury from exposure to hazardous materials. See Section 3.12 for further discussion.
Objective PS-4.2: Regulate the transport, storage, use and disposal of hazardous materials in order to reduce the risks of damage and injury from hazardous materials to acceptable levels.	**The project would be consistent with this objective.** The project proposes mitigation measures that would be implemented to reduce potential risks of damage or injury resulting from transport, storage, use and disposal of hazardous materials. See Section 3.12 for further discussion.
RECREATION	
Policy OS-7g: Use the following guidelines to determine consistency of projects involving lands with abandoned railroad rights of way where reasonably related to the impacts of the project: The project does not or will not preclude the use of the right-of-way for trails. A width of 60 feet generally is reserved for trail purposes, unless the Regional Parks Department determines that a different width would be adequate. An irrevocable offer of dedication for the right-of-way has been made to the County of Sonoma.	**The project is consistent with this policy.** A portion of the proposed reclaimed water pipeline would be located within the existing Northwestern Pacific Railroad right-of-way, and would not preclude the use of the right-of-way for trail development and use. The Proposed Project would not preclude the development of a segment of the trail system through a 60-foot corridor within the abandoned railroad right of way. A portion of the proposed project would be located within dedicated railroad rights-of-way.
Policy OS-8q: Use the following criteria to determine consistency of public and private projects with this element: Development of lands traversed or adjoined by a designated Class I bikeway accommodates, and does not conflict, with development of the bikeway. Construction or widening of roads designated for Class II bikeways meets the criteria for Class II bikeways specified in the Bikeways Plan.	The project is consistent with this policy. The proposed project includes placement of recycled water pipelines within area roadway right-of-way. The proposed project would be buried adjacent to roadways and would not conflict with potential development of bikeways. No roads are proposed to be constructed or widened in correlation with the proposed project.

Table 3.9-3. (Continued)

Policy	Project Consistency
RECREATION	
Construction or widening of roads designated for Class III bikeways meets the criteria for Class III bikeways specified in the Bikeways Plan. In the event that a project proposed without inclusion of a bikeway has a significant, overriding public benefit, or no funds are available for bikeway construction, the project may be found consistent with this Element and the Bikeways Plan if it does not preclude future construction of a bikeway and makes the best feasible provision for interim bicycle travel.	No roads are proposed to be constructed or widened in correlation with the proposed project.
TRANSPORTATION/TRAFFIC	
Goal CT-1: Develop a comprehensive circulation and transit system that is safe, efficient, environmentally sound, accessible, and coordinated with the land use plan.	**The project would be consistent with this goal.** Though the project does not propose creation or expansion of a circulation or transit system, the project would be consistent with this goal. A Traffic Control Plan would be prepared for the proposed project. The plan would identify safe, efficient, and environmentally sound circulation options for pedestrians, bicyclists, the transit system, and motorists.
Policy CT-3h: Oppose abandonment of freight service, but if service from Sonoma County northward is abandoned and the right-of-way is to be disposed of, acquire it for future use as alternative transportation.	**Because the Proposed Project does not propose the development of an alternative transportation use along the railroad alignment, the project would be consistent with this policy.** A portion of the proposed project would be located within the existing Northwestern Pacific Railroad right-of-way; however, the proposed project would not preclude the development and use of the right-of-way for alternative transportation.
Policy CT-3i: Resolve the future use of the NWPRR right-of-way for public transportation purposes in cooperation with corridor communities so that an integrated and mutually supportive set of transportation projects may be defined for Sonoma and Marin Counties.	**Because the Proposed Project does not propose the development of an alternative transportation use along the railroad alignment, the project would be consistent with this policy.** A portion of the proposed project would be located within the existing Northwestern Pacific Railroad right-of-way; however, the proposed project would not preclude the development and use of the right-of-way for alternative transportation.
UTILITIES/SERVICE SYSTEMS	
Goal PF-1: Assure that water supply and wastewater management facilities are adequate to meet projected needs and are provided in a manner that preserves riparian habitats, supports water dependent resources, enhances recreational opportunities, and preserves and enhances water quality and the environment.	**The project would be consistent with this goal.** Use of recycled water for agricultural purposes on project lands would reduce reliance on the Russian River and its tributaries as well as on local groundwater wells.
Objective PF-1.1: Plan for healthful water supplies and wastewater facilities adequate to serve the growth projected in the general plan.	**The project would be consistent with this objective.** Use of recycled water for agricultural purposes on project lands would reduce reliance on the Russian River and its tributaries as well as on local groundwater wells.
Objective PF-1.2: Operate County water and wastewater facilities in compliance with applicable state and federal standards.	**The project would be consistent with this objective.** Operation of the NSCARP would comply with applicable local, state and federal standards.

Table 3.9-3. (Continued)

Policy	Project Consistency
UTILITIES/SERVICE SYSTEMS	
Objective PF-2.8: Continue to coordinate fire protection services and planning with all other related agencies.	**The project would be consistent with this objective.** Implementation of the project would include early coordination with emergency response providers to ensure safe and efficient traffic movement throughout the project area.
Policy PF-2s: Public utility facilities other than transmission line corridors may be designated as "Public/Quasi-Public" on the land use map. Allow consideration of minor facilities in any land use category where they are compatible with neighborhood character and preservation of natural and scenic resources.	**The project would be consistent with this policy.** Project components would be located primarily in lands designated for agricultural use; however, pipelines are proposed for installation through Limited Industrial and Resources and Rural Development. Underground pipelines would not conflict with the existing land use designation, and therefore, would be compatible with the neighborhood character.

Source: Sonoma County General Plan, 1989

3.9.3 Methodology

The adopted General Plan land use map for Sonoma County was used to determine planned land uses, Community Separators, non-urban land, and public open space used as the basis for evaluation of impacts.

3.9.4 CEQA Thresholds of Significance Criteria

The evaluation criteria for Land Use impacts are presented in Table 3.9-4. These criteria are drawn from CEQA requirements and supplemented with applicable goals, objectives, and policies from the Sonoma County General Plan. Land Use impacts would be considered significant if the project divided an established community; would result in inconsistencies with the Sonoma County General Plan Land Use Element, adopted land use plan map, or adopted zoning regulations; or introduced inappropriate uses in a Community Separator.

Table 3.9-4. CEQA Evaluation Criteria/Thresholds of Significance

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will the NSCARP physically divide an established community?	Physical barrier to movement within the community.	Any such barrier.	CEQA Guidelines Appendix G, Checklist Item IX(a)
2. Will the NSCARP be inconsistent with the policies of the Land Use Element and land use plan map of the adopted Sonoma County General Plan, or with adopted zoning regulations?	Acres of land.	Greater than 0 acres of land.	CEQA Guidelines Appendix G, Checklist Item IX(b). Sonoma County General Plan Land Use Element and land use plan map. Sonoma County zoning regulations.
3. Will the NSCARP conflict with any applicable habitat	Inconsistencies with applicable habitat	Any such inconsistencies.	CEQA Guidelines Appendix G, Checklist

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
conservation plan or natural community conservation plan?	conservation plans or natural community conservation plans.		Item IX(c)
4. Will the NSCARP introduce inappropriate uses in a Community Separator?	Acres of land (developed in inappropriate uses) within Community Separators	Greater than 0 acres of land	Sonoma County General Plan, Land Use Element, Objective LU-5.1

3.9.5 Alternatives Analysis

Alternative 1 – No Project/Action

Under the No Project Alternative, NSCARP would not be built. As such, the potential impacts associated with project development would not occur under the No Project Alternative. Implementation of the No Project Alternative would result in a continuation of existing irrigation practices and no impacts to existing or planned land uses would result.

Because the No Project Alternative would result in no change to existing conditions, this impact is considered less-than-significant. The No Project Alternative, however, would not meet the goals and objectives of the North Sonoma County Agricultural Reuse Project.

Alternative 2 – Entire NSCARP

Impact LU-1: NSCARP has the potential to physically divide a community.

Discussion: The Proposed Project involves the installation of pipelines (primarily within public rights-of-way), the construction of booster and distribution pump stations, and the development or expansion of reservoirs. Most proposed recycled water pipelines would be installed beneath the ground surface or underneath existing roads. The remaining proposed recycled water pipelines would be attached to an existing bridge and would remain aboveground. Pipeline installation is not anticipated to divide an established community. Likewise, the proposed expansion to existing reservoirs and the proposed construction of new reservoirs is not anticipated to divide an established community.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 1

Mitigation Measure: None required

Impact LU-2: NSCARP has the potential to conflict with goals, objectives, and policies identified in the Sonoma County General Plan.

Discussion: Proposed reservoirs would be consistent with the County General Plan goals, objectives, and policies. Reservoirs would be located primarily in the unincorporated areas of Sonoma County. The predominant land use designations in the North County are Agriculture (Land Extensive Agriculture and Diverse Agriculture) and Resources and Rural Development. Minor public services uses or facilities, including, but not limited to, reservoirs, storage tanks, and pumping stations, may be allowed in these designations with a use permit, provided that they are consistent with policies concerning agricultural production (in the Agricultural designations), compatibility with neighborhood character, and preservation of natural and scenic resources.

Reservoirs located in the unincorporated areas of Sonoma County would be consistent with County Goal LU-5 and Objective LU-5.1 of maintaining Community Separators in open or natural character with low intensities of development.

To the extent the reservoirs are used to store water for agricultural use, they would be consistent with Goal LU-8 and Objectives LU-8.1 and LU-11.1 of protecting agricultural lands and avoiding incompatible non-agricultural uses, as well as retaining agricultural lands in Dry Creek, Alexander Valley, and Oat Valley in agricultural production.

Because the reservoirs would be supporting agriculture, and similar in character to existing facilities for storing water in agricultural areas, the reservoir area would be compatible in the Agricultural and Resources and Rural Development designations of the Sonoma County General Plan. They would also be compatible in the Public and Quasi-Public designation. All proposed storage facilities would be located on lands designated as Agricultural or Resources and Rural Development; therefore, the NSCARP facilities would be consistent with the County land use designations.

As shown in Table 3.9-4, NSCARP would be consistent with all Sonoma County General Plan goals, objectives, and policies identified as applicable to the NSCARP with the exception of Policies CT-3h and CT-3i and Objective AR-8.1. Because the Proposed Project does not identify the development of transportation services along the Northwestern Pacific Railroad right-of-way, the NSCARP would not be inconsistent with Policies CT-3h and CT-3i.

Objective AR-8.1 supports the continued participation in the Williamson Act Contract program. The proposed project would require the purchase of parcels or portions of parcels under Williamson Act Contract; however, the project has been designed to minimize Williamson Act Contract cancellation. The purchase of portions or entire parcels currently under Williamson Act Contract would have the potential to result in cancellation of such contracts. Mitigation Measure AG-1 would be implemented; however, this impact would remain Significant and Unavoidable.

Impact Category: Significant and Unavoidable

CEQA Threshold of Significance Criterion: 1

Impact after Mitigation: **Significant and Unavoidable**. Implementation of Mitigation Measure AG-1 would enable the SCWA to avoid impacts to status farmland and lands subject to Williamson Act Contracts to the extent feasible. However, NSCARP would still result in a significant and unavoidable impact associated with loss of status farmland and lands subject to Williamson Act Contracts.

Impact LU-3: The Proposed Project has the potential to conflict with the USFWS Recovery Plan for California Freshwater Shrimp and the Recovery Plan for the California Red-Legged Frog.

Discussion: The Recovery Plan for California Freshwater Shrimp, prepared by the U.S. Fish and Wildlife Service (USFWS) in 1998, is the only recovery plan applicable to the NSCARP area. Streams identified within the recovery plan as being potential habitat for the California Freshwater Shrimp (*Syncaris pacifica*) include: Blucher Creek, Santa Rosa Creek, Jonive Creek, Redwood Creek, Atascadero Creek, Green Valley Creek, Salmon Creek, East Austin Creek, Big Austin Creek, Sonoma Creek, Yulupa Creek, Garnett Creek, Huichica Creek, and Napa Creek. The aforementioned creeks are located outside of the project area.

The 2002 USFWS Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*) identifies portions of Sonoma County as being within California Red-legged Frog recovery units; however, only the southern portion of Sonoma County is located within an identified recovery unit (North Coast and North San Francisco Bay). The NSCARP area is not within the part of the County for which the USFWS Recovery Plans are applicable; therefore, Alternative 2 would not conflict with USFWS Recovery Plans. This impact is considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 1

Mitigation Measure: None required

Impact LU-4: NSCARP has the potential to introduce inappropriate uses in a Community Separator.

Discussion: The Sonoma County General Plan identifies eight Community Separators, which are intended to maintain community identity and prevent the merging of cities and communities into continuous areas of urban development. The separators are planned for low intensities of use that do not require urban services. Commercial and industrial uses in the separators are intended to be those related to agricultural and resource land use categories. The only Community Separator located in the vicinity of NSCARP components is the Healdsburg-Windsor Community Separator along U.S. Highway 101.

For Alternative 2, pipeline segments, pump stations, and a reservoir would be placed inside, or directly adjacent to, land designated by the County as the Healdsburg-Windsor Community Separator. Table 3.1-4 summarizes the approximate footages of pipelines, number of pump stations, and/or approximate square footage of reservoir within designated Community Separators for each Alternative 2 subarea.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 1

Mitigation Measure LU-4: Implement Mitigation Measure AES-1

Impact after Mitigation: **Less than Significant**. Implementation of Mitigation Measure AES-1 would minimize impacts to a level of less than significant.

Alternative 3 – Alexander Valley-Jordan Reservoir Subset

The study area for the land use analysis is located in the same region as Alternative 2, however, is smaller in scale. Project design for Alternative 3 would be similar to Alternative 2. Most proposed recycled water pipelines would be installed beneath the ground surface or underneath existing roads. The remaining proposed recycled water pipelines would be attached to an existing bridge and would remain aboveground. Like Alternative 2, pipeline installation and proposed expansion to existing reservoirs and proposed construction of new reservoirs associated with Alternative 3 is not anticipated to physically divide a community.

Alternative 3 would not be located along the Northwestern Pacific Railroad right-of-way; therefore, Policies CT-3h and CT-3i would not be applicable to Alternative 3. Like Alternative 2, Alternative 3 would require the acquisition of lands under Williamson Act Contracts. If acquisition of such lands required cancellation of Williamson Act Contracts, Alternative 3 would be inconsistent with Objective AR-8.1, which supports the continued participation in the Williamson Act Contract program. Mitigation Measure AG-1 would be implemented; however, the impact would remain Significant and Unavoidable.

Like Alternative 2, the Alternative 3 area is not within the part of the County for which the USFWS Recovery Plans are applicable. No portions of the Alternative 3 area are within an area identified in the Sonoma County General Plan as a Community Separator.

Alternative 4 – Russian River Valley-Westside Subset

The study area for the land use analysis is located in the same region as Alternative 2, however, is smaller in scale. Project design for Alternative 4 would be similar to Alternative 2. Proposed recycled water pipelines would be installed beneath the ground surface or underneath existing roads. Like Alternative 2, pipeline installation and proposed expansion to existing reservoirs and proposed construction of new reservoirs associated with Alternative 4 is not anticipated to physically divide a community.

Alternative 4 would not be located along the Northwestern Pacific Railroad right-of-way; therefore, Policies CT-3h and CT-3i would not be applicable to Alternative 4. Like Alternative 2, Alternative 4 would require the acquisition of lands under Williamson Act Contracts. If acquisition of such lands required cancellation of Williamson Act Contracts, Alternative 4 would be inconsistent with Objective AR-8.1, which supports the continued participation in the Williamson Act Contract program. Mitigation Measure AG-1 would be implemented; however, the impact would remain Significant and Unavoidable.

Like Alternative 2, the Alternative 4 area is not within the part of the County for which the USFWS Recovery Plans are applicable. Approximately 2,000 feet of pipeline would be located in the Healdsburg-Windsor Community Separator; however, impacts to visual resources would be limited to temporary construction activities and would not directly or indirectly create an urbanized corridor. Impacts are considered less than significant.

3.10 NOISE

3.10.1 Background

This section discusses the existing noise environment at the locations of the various project components. Potential noise-related environmental impacts on sensitive receptors are evaluated from short-term construction activities and long-term pump station operation and appropriate mitigation measures are proposed for each potential significant environmental impact. Other sections of this EIR have been referenced, as appropriate, if impacts related to noise could result in impacts to other resource areas.

General Information on Noise

Noise is generally defined as unwanted or objectionable sound. Noise levels are measured on a logarithmic scale because of the physical characteristics of sound transmission and reception. Noise energy is typically reported in units of decibels (dB). Decibels and other technical terms are defined in Table 3.10-1.

Noise levels diminish (or attenuate) as distance to the source increases according to the inverse square rule, but the rate constant varies with type of sound source. Sound attenuation from point sources, such as industrial facilities, is about 6 dB per doubling of distance. Heavily traveled roads with few gaps in traffic behave as continuous line sources and attenuate at 3 dB per doubling of distance. Noise from more lightly traveled roads is attenuated at 4.5 dB per doubling of distance.

Community noise levels are measured in terms of the A-weighted decibel (dBA). A-weighting is a frequency correction that correlates overall sound pressure levels with the frequency response of the human ear. Equivalent noise level (Leq) is the average noise level on an energy basis for a specific time period. The duration of noise and the time of day at which it occurs are important factors in determining the impact on communities. Figure 3.10-1 provides a graphical representation of sound energy and potential adverse effects of common sounds.

Noise is more disturbing at night and noise indices have been developed to account for the time of day and duration of noise generation. The Community Noise Equivalent (CNEL) and Day Night Average Level (DNL or Ldn) are such indices. These indices are time-weighted average values equal to the amount of acoustic energy equivalent to a time-varying sound over a 24-hour period. The CNEL index penalizes night-time noise (10 p.m. to 7 a.m.) by adding 5 dB to account for increased sensitivity of the community after dark. The Ldn index penalizes night-time noise the same as the CNEL index, but does not penalize evening noise.

Perception of noise has no simple correlation with acoustical energy. Different noise sources cannot be added directly to give a dB rating for the combined noise sources. For example, two noise sources producing an equal dB level at a given location will produce a combined noise level of 3 dB greater than each sound alone. Table 3.10-1 gives definitions to acoustic terms.

Table 3.10-1. Acoustic Terms and Definitions

Term	Definitions
Decibel, DB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the sample sound pressure to the standard sound pressure, which is 20 micropascals (20 micronewtons per square meter)
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure
A-Weighted Sound Level, dB	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear, and correlates well with subjective reactions to noise. All sound levels in this reports are A-weighted
Equivalent Noise Level, Leq	The average A-weighted noise level during the measurement period
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 P.M. to 10:00 P.M. and after addition of 10 decibels to sound levels in the night between 10:00 P.M. and 7:00 A.M.
Day/Night Noise Level, Ldn	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 P.M. and 7:00 A.M.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, tonal or information content, as well as the prevailing ambient noise level

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the affect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration (FTA, 1995). Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration.

Effects of Noise

People are subject to a multitude of sounds in the environment. Typical noise levels of indoor/outdoor environments and public response to these sounds are shown in Figure 3.10-1. Excessive noise cannot only be undesirable but may also cause physical and/or psychological damage. The amount of annoyance or damage caused by noise is dependent primarily upon three factors: (1) the amount and nature of the noise; (2) the amount of ambient noise present

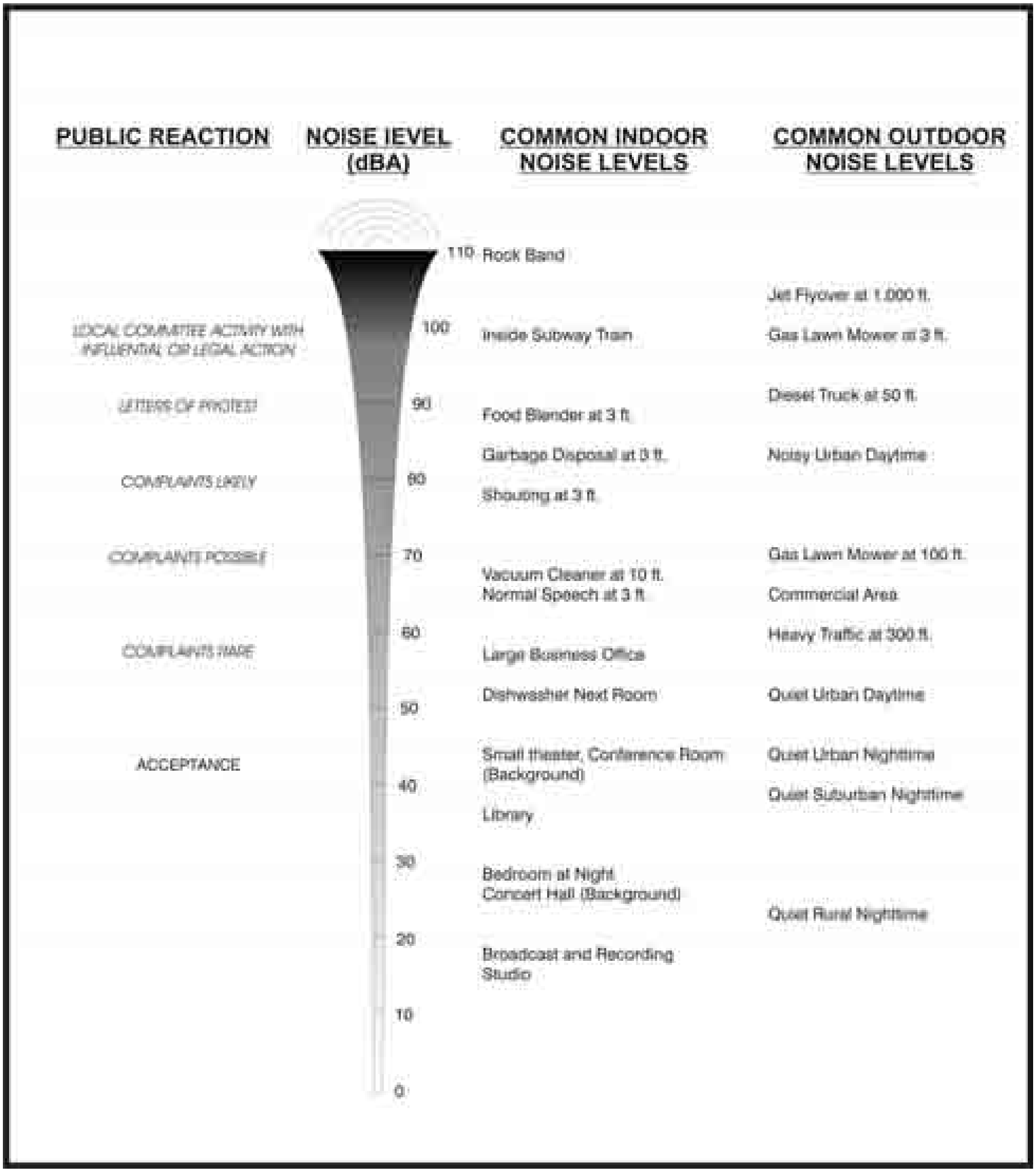


Figure 3.10-1. Magnitude of Common Sounds

before the intruding noise; and (3) the activity of the person working or living in the noise source area.

Although there has been some dispute in the scientific community regarding the detrimental effects of noise, a number of general conclusions have been reached:

- Noise of sufficient intensity can cause irreversible hearing damage;
- Noise can produce physiological changes in humans and animals;
- Noise can interfere with speech and other communication; and,
- Noise can be a major source of annoyance by disturbing sleep, rest, and relaxation.

Noise Sensitive Land Uses

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses identified by Sonoma County include residences, hospitals and nursing homes, schools, churches, libraries, and office building interiors, as well as other uses deemed noise sensitive by the local jurisdiction. Land uses within the vicinity that considered noise-sensitive land uses include assorted residences, residential subdivisions, churches, and schools. Several of the proposed pump stations are located within the general vicinity of residences, as well as a California Department of Forestry (CDF) station with an attached residence.

3.10.2 Physical Setting

Sensitive noise-receptors within the project area occur in the vicinity of six proposed pump stations for which ambient noise measurements were taken (a seventh subsequently proposed pump station with nearby noise-receptors at Denner Ranch was not measured). These receptors near the proposed pump stations are residences, except for a CDF station, which is located approximately 500 feet from the Lytton pumping station. Distances of the residences from their respective pumping stations vary from approximately 100 feet to 2,500 feet.

Existing Noise Environment

County of Sonoma

In suburban areas, the noise environment results primarily from transportation sources and other localized activities. Typically, Ldn noise levels at noise-sensitive residential receptors range from about 50 dBA to 55 dBA in the quietest suburban areas to about 70 dBA to 75 dBA near highways or arterial roadways. Background noise levels during the daytime typically range from about 43 dBA to about 55 dBA. During the nighttime, background noise levels in suburban areas are approximately 10 dBA lower than daytime levels, ranging from about 32 dBA to 45 dBA (IRWP, 2003).

The noise environment within the NSCARP area varies significantly due to the large geographic area and various noise sources contributing to the local noise environment. Due to the undeveloped rural and agricultural nature of the land uses in the vicinity of the proposed pumping stations, the major source of existing noise in these areas is transportation-related. At proposed pumping stations where there are roadways in the vicinity, ambient Leq noise measurements registered the highest readings. The proposed Bilbro-Biocca pumping station registered the highest Leq reading (65.7 dBA) due to its location adjacent to U.S Highway 101. Pumping stations with sensitive noise-receptors in the vicinity varied in ambient Leq dBA levels depending on their vicinity to a roadway.

Proposed Pipeline Route

Existing sensitive noise receptors and general noise environment characteristics are broken down by NSCARP project subareas as follows (proposed pipeline routes typically follow public roadways in each subarea, although portions are overland through vineyards and hills.

Northern Alexander Valley

The northern section of this subarea, east of the Russian River, is characterized by farmhouses and ranch homes and occasional small wineries scattered every several hundred to a few thousand feet along River Road. More concentrated clusters of residences occur in places such as Cedar Lane, Palomino Road and Highland Ranch Road. Palomino Lakes is a residential area characterized by large-lot ranch homes set off of River Road; however, topographical and vegetative characteristics generally shield these homes from the road. In general, the sensitive noise receptors that may be affected by short-term construction noise are those homes on the west side of River Road.

Along the west side of the Russian River, land uses are dominated by vineyard operations and pasture areas in the valley, along with scattered homes and occasionally other sensitive noise receptors such as a motel, a church, and the Geyserville Educational Park (a high school/middle school) on Moody Lane near Highway 128. In general, this area is more open and level topographically than the eastern side of the river. Few stationary noise generators occur in this area with the exception of a lumber yard along Asti Road.

Existing noise generators in this area are characterized by transportation sources. U.S Highway 101 is the heaviest-traveled road in the project subarea. The California Northern railroad also transverses the area on a northerly-southerly route to the west of the river; however, much of this rail-line crosses through vineyards and away from homes along area roads. Other roads in this subarea, such as Asti Road, River Road, Geyserville Road, and Dutcher Creek Road, are two-lane and lightly-traveled. Additionally, there is the Cloverdale Municipal Airport, located three miles southeast of the City of Cloverdale between Asti Road and the rail line. This airport averages 30 aircraft operations per day (Airnav.com, 2005).

Further south in this project subarea is the small unincorporated town of Geyserville, located at the junction of US Highway 101 and Highway 128, which crosses over the Russian River. This area contains a cluster of homes, shops and stores, an elementary school, and motels. Geyserville makes up the largest concentration of sensitive noise receptors in this subarea. With the exception of the Geyserville area and U.S Highway 101, the existing noise environment in this subarea is dominated by agricultural operations (vineyards, wineries), and lightly traveled connector routes. Please reference Figure 2-5 for a visual representation of this subarea.

Alexander Valley

This subarea has a similar noise environment as the Northern Alexander Valley subarea. This subarea has a heavier concentration of vineyards than the Alexander Valley subarea and contains a greater length of proposed pipeline. With the exception of Highway 128 (the major existing noise source), the roads to which the proposed pipeline routes will run adjacent are rural in nature, lightly traveled, and are bordered by vineyards. Portions of the proposed pipeline route also cross overland through vineyards. The junction of Highway 128 and West Sausal Road, known as "Jimtown", contains a small concentration of roadside general stores and farmhouses. The Alexander Valley Elementary School is located along Highway 128.No major stationary noise generators were identified. However, seasonal vineyard operations may be a dominant, but sporadic, noise source. Please reference Figure 2-3 for a visual representation of this subarea.

Dry Creek Valley

Existing sensitive noise receptors in this subarea are characterized by residential development along Highway 101 and the outskirts of the City of Healdsburg. Dry Creek Road, which travels west up the Dry Creek Valley from Highway 101 and Healdsburg, is a moderately traveled two-lane road with a cluster of large-lot homes about one mile from Highway 101. Kinley Road, which parallels Highway 101 heading south, joins with Westside Road and a small housing subdivision just west of Highway 101. There is also a truck sales yards as well as a propane tank sales company in this vicinity. In the City of Healdsburg itself, land uses immediately adjacent to Highway 101 are commercial and industrial in nature, including a lumber mill at the terminus of Dry Creek Road on the eastern side of Highway 101.

The Healdsburg Municipal Airport is located three miles northwest of the City of Healdsburg on Lytton Springs Road, approximately 1,000 feet east of the junction with Dry Creek Road. This airport averages 86 aircraft operations per day (AirNav.com, 2005).

The remaining portion of the Dry Creek Valley area is very rural in nature, with narrow and winding roads interspersed with homes, vineyards, and small wineries along proposed pipeline routes. This area is generally free of substantial transportation noise. Along the western edge of the valley is a cluster of ranch homes between Yoakim Bridge Road and Lambert Bridge Road. One portion of this subarea, along Mill Creek Road on the western side of the valley, contains large areas of open space and pasture, as well as vineyards. The major topographic features of this subarea are the narrow valley floor and prominent ridgelines along either side. Figure 2-4 provides a visual representation of the Dry Creek Valley area.

Russian River Valley

The existing noise environment of this subarea is very similar to that of the other three subareas. Old Redwood Highway and portions of Eastside Road and River Road are moderately traveled, and are the major existing noise sources in this subarea other than Highway 101. Additionally, there is a large industrial building near the junction of Eastside Road and Old Redwood Highway. This particular area also contains a cluster of homes spaced every few hundred feet. Other land uses in this subarea include bed and breakfast inns and wineries.

The Charles M. Schulz Sonoma County Airport is located six miles northwest of the City of Santa Rosa. It is the largest airport within the proposed project vicinity, averaging 313 aircraft operations per day (AirNav.com, 2005).

The valley floor of this subarea is dominated by large areas of vineyards and some pasture land, as well the Russian River. The western edge and southern portions of the valley are generally more rugged and rural, with widespread, scattered residences. Except for the area of Old Redwood Road and the northern portion of Eastside Road, there are no major concentrations of sensitive noise receptors in the Russian River Valley Subarea. Figure 2-6 provides a visual representation of this subarea.

Proposed Pump Stations

Table 3.10-2 summarizes pump stations and their respective horsepower ratings for Alternatives 2, 3, and 4.

Table 3.10-2. Proposed Pump Stations for Alternatives 2, 3, and 4

Subarea	Pump Station (h.p.)	Project Alternatives		
		2	3	4
Alexander Valley				
	Jordan (500)	X	X	
	T-Bar-T (40)	X		
	Lytton (1,150)	X		
Dry Creek Valley				
	Kumielis #1 (560)	X		
	Kumielis #2 (400)	X		
	Passalacqua #1 (560)	X		
	Passalacqua #2 (560)	X		
Russian River Valley				
	Bucher (1,000)	X		X
	Russell-Bucher (360)	X		X
	Gallo-Twin Valley (150)	X		X
	J-Wine (150)	X		
	Denner Ranch (220)	X		
Northern Alexander Valley				
	Bilbro-Biocca (130)	X		
	Todd (120)	X		
	Klein #1 (450)	X		
	Klein #2 (200)	X		

Existing Noise Levels at Proposed Pumping Station Sites

Fifteen-minute Leq dBA measurements were conducted by Padre Associates, Inc. on 12/14/05 and 12/15/05 at 13 pumping station sites using a Larson-Davis Model DSP-80 precision integrating sound level meter.

Sound level data were collected during the two-day period noted above. The purpose of these measurements was to quantify ambient sound levels at specific pumping station locations, adjacent to noise sensitive receptors. Weather conditions were generally clear and calm. Table 3.10-3 summarizes the results of the ambient noise-level monitoring.

Table 3.10-3. Summary of Ambient Noise Monitoring

Pumping Station ID	Region	Type	Day	Time	Leq dBA
Klein #1	NAV	Booster	12/05/2005	1:30 p.m.-1:45 p.m.	59.2
Klein #2	NAV	Distribution	12/15/2005	1:52 p.m.-2:07 p.m.	37.9
Gallo Asti	NAV	Distribution	None Collected		
Bilbro-Biocca	NAV	Booster	12/15/2005	12:17 p.m. - 12:32 p.m.	65.7
Todd	NAV	Booster	12/15/2005	2:20 p.m. - 2:35 p.m.	49.2
T-bar-T	AVF	---	12/15/2005	10:48 a.m. - 11:03 a.m.	43.3
Jordan	AVF	Booster	12/15/2005	10:18 a.m. - 10:33 a.m.	53.8
Lytton	AVF	Distribution	12/15/2005	9:30 a.m. - 9:45 a.m.	51.3
Passalacqua #1	DCV	Distribution	12/14/2005	4:30 p.m. - 4:45 p.m.	62.4
Passalacqua #2	DCV	Distribution	12/14/2005	4:50 p.m. - 5:05 p.m.	53.5
Kuimelis #1	DCV	Distribution	None Collected		
Kuimelis #2	DCV	Booster	None Collected		
Bucher	RRV	Booster	12/14/2005	4:00 p.m. - 4:15 p.m.	48.8
Russell-Bucher	RRV	Distribution	12/14/2005	3:30 p.m. - 3:45 p.m.	48.5
JWine	RRV	Distribution	12/14/2005	2:00 p.m. - 2:15 p.m.	49.1
Gallo Twin Valley	RRV	Distribution	12/14/2005	3:02 p.m. - 3:17 p.m.	50.3
Denner Ranch	RRV	Distribution	None Collected		

Notes: NAV = Northern Alexander Valley, AVF = Alexander Valley, DCV = Dry Creek Valley, RRV = Russian River Valley. (None Collected) = No noise sensitive receptors located in vicinity.

3.10.3 Regulatory Setting

Federal

Reclamation does not have any noise standards. No other federal noise standards would apply to this project.

State

California requires each local government entity to implement a noise element as part of its General Plan. Guidelines for the Preparation and Content of the Noise Element of the General Plan, published by California Governors Office of Planning and Research, discuss the compatibility of various land uses as a function of community noise exposure.

The Office of Noise Control (ONC) of the California Department of Health published a model noise ordinance in 1977. This model ordinance provides recommended limits on noise generated by various types of noise sources. Because many local ordinances do not specify limits on construction noise, the construction noise limits specified in the model ordinance are provided in Table 3.10-4 as a point of reference.

Table 3.10-4. Office of Noise Control Construction Noise Limits.

Time of Day	Single-Family Residential		Multi-Family Residential		Semi-Residential/Commercial	
	Duration <10days	Duration ≥ 10 days	Duration <10days	Duration ≥ 10 days	Duration <10days	Duration ≥ 10 days
Daily, except Sundays and legal holidays 7 a.m. to 7 p.m.	75 dBA	60 dBA	80 dBA	65 dBA	85 dBA	70 dBA
Daily, 7 p.m. to 7 a.m. and all day Sunday and legal holidays	60 dBA	50 dBA	65 dBA	55 dBA	70 dBA	60 dBA

Source: Office of Noise Control, 1977

Local

General Plans are required by state law and serve as the jurisdiction's blueprint for land use and development. These plans are comprehensive, long-term documents that provide details to guide the physical development of the jurisdiction, establish policies, and identify ways to put the policies into action. The County of Sonoma General Plan's Noise Element has established objectives and policies concerning the generation and control of noise that could adversely affect sensitive noise receptors and land uses. The noise element identifies goals and policies to support achievement of goals. The goals and policies contained in general plans are applicable throughout the jurisdiction. Table 3.10-5 reflects exterior noise level standards that were officially adopted with the 1989 General Plan.

Table 3.10-5. Noise Level Performance Standards

Maximum Exterior Noise Level Standards, dBA			
Category of Time Period	**Cumulative Duration of Noise Event in any one-hour period**	**Daytime 7a.m. to 10 p.m.**	**Nighttime 10 p.m. to 7 a.m.**
1	30 - 60 minutes	50	45
2	15 - 30 minutes	55	50
3	5 - 15 minutes	60	55
4	1 - 5 minutes	65	60
5	0 -1 minutes	70	65

Source: Sonoma County General Plan, Noise Element, 1989

Refer to Section 3.9, Table 3.9.3 for a list of applicable goals, objectives, and policies of the Sonoma County General Plan regarding noise.

3.10.4 Methodology

Each project alternative includes a combination of components that have been identified as necessary to meet project objectives. The noise analysis predicts noise levels that could result from the construction of these facilities, and from subsequent facility operation and maintenance activities resulting from implementation of each of the components. The significance of the noise impacts from each component is assessed against the applicable evaluation criteria.

The noise levels associated with a particular component are determined by identifying the individual noise sources that make up the component, adding them together, and then calculating the effect of distance between the source and the receiver. There are other factors that provide additional reduction in the noise, including molecular absorption by the atmosphere, other atmospheric effects such as wind and temperature profiles, ground effects, and barriers. In this analysis, only distance and building material are assumed in the calculation of noise attenuation. The noise model used in this analysis is a spreadsheet that uses USEPA reference values and calculates geometric divergence at a rate of 6 dBA per doubling of distance, subtracts ground attenuation, and adds various noise sources together.

3.10.5 CEQA Thresholds of Significance Criteria

Table 3.10-6 contains evaluation criteria used in determining potential significant noise impacts.

Table 3.10-6. CEQA Evaluation Criteria/Thresholds of Significance

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will construction or operation of the NSCARP generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Projected noise levels as measured at the receiving land use based on applicable state or local regulation.	Greater than noise level for receiving land use allowable by local ordinance or regulation.	CEQA Guidelines Appendix G, Checklist Item XI (a). Noise Element of the General Plans of Sonoma County and City of Healdsburg.
2. Will NSCARP construction activities result in generation of excessive ground-borne vibration levels?	Projected vibration levels at receiving land use.	Greater than 0.5 inch/sec. peak particle velocity	CEQA Guidelines Appendix G, Checklist Item XI (b). U.S. Bureau of Mines Safe limit for normal structures.
3. Will operation of the NSCARP cause a substantial permanent increase in ambient noise levels above existing levels in the vicinity?	Projected noise levels at receiving land uses with the project compared to ambient noise levels.	a. Greater than 5 dBA Ldn increase and remaining below “normally acceptable” noise level for affected use, or b. Greater than 3 dBA Ldn increase exceeding the “normally acceptable” level for the affected use.	CEQA Guidelines Appendix G, Checklist Item XI (c). Historical precedent based upon community annoyance studies.
4. Will construction activities and traffic required for the NSCARP result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity?	Projected noise levels at the receiving land use with the construction activities compared to existing ambient noise levels.	Greater than 5 dBA Leq increase in noise above existing ambient noise during daytime or nighttime.	CEQA Guidelines Appendix G, Checklist Item XI (d). Historical precedent based upon community annoyance studies.

Table 3.10-6. CEQA Evaluation Criteria/Thresholds of Significance (Continued)

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
5. Will the NSCARP expose people to noise in the vicinity of a public or private airport?	Incompatible use located within: a. An adopted airport land use plan; b. Two miles of an airport for which there is no adopted airport land use plan	Any such use.	CEQA Guidelines Appendix G, Checklist Item XI (e) and Item XI (f).

Table 3.10-7 summarizes typical community noise exposure and acceptability for various land uses. It is used as a reference to determine Ldn increases as noted in Evaluation Criterion 3.

Table 3.10-7. Land Use Compatibility for Community Noise Environments

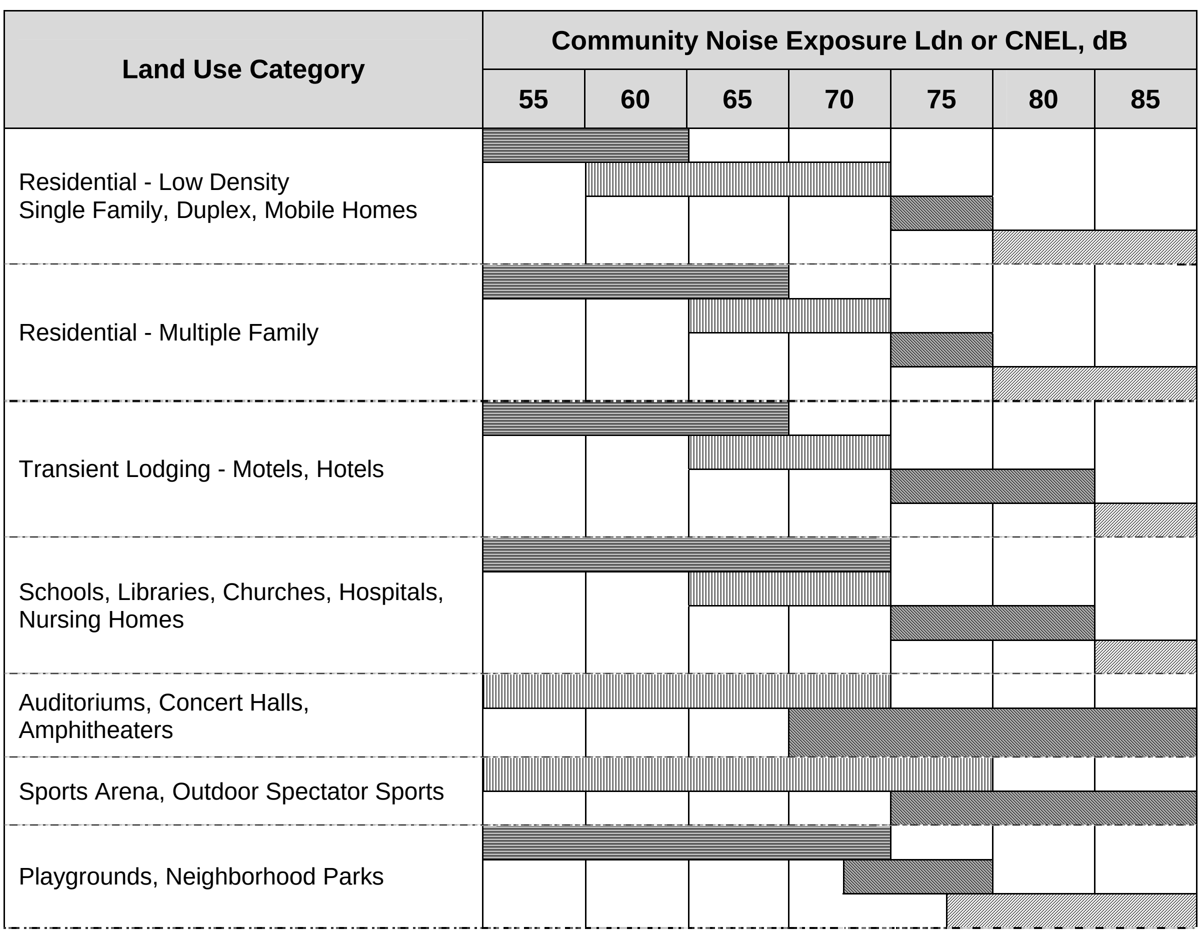
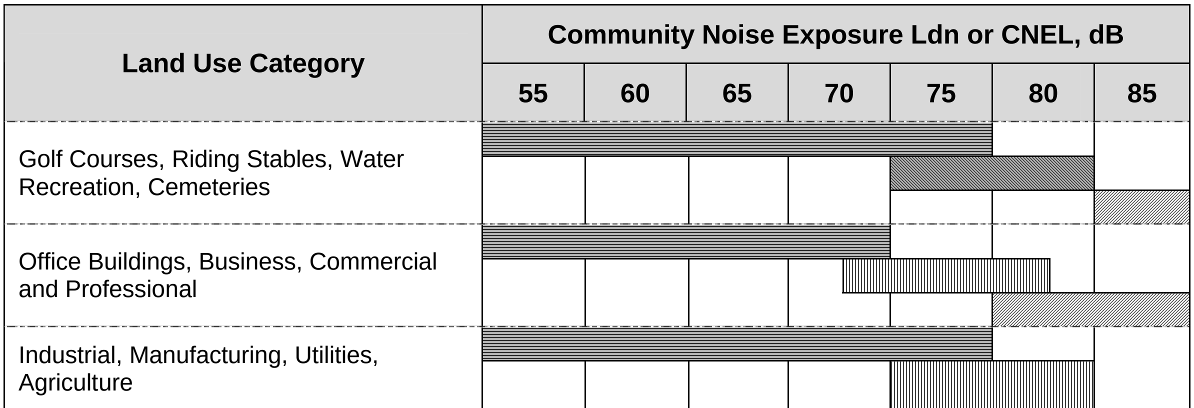


Table 3.10-7. Land Use Compatibility for Community Noise Environments (Continued)



(horizontal hatching)	Normally Acceptable: specified land use is satisfactory, based upon the assumption that any buildings involved are of normal construction without any special noise insulation requirements.
(vertical hatching)	Conditionally Acceptable: New construction or development should only be undertaken after a detailed analysis of the noise reduction requirements is made and the needed insulation features included in the design.
(dark diagonal hatching)	Normally Unacceptable: New construction or development should generally be discouraged. If new development is to proceed, a detailed analysis of the noise reduction requirements is made and the needed insulation features included in the design.
(light diagonal hatching)	Clearly Unacceptable: New development or construction should not be undertaken.

Source: California Department of Health, Office of Noise Control

3.10.6 Alternatives Analysis

Alternative 1 - No Project/Action

The "No Action" Alternative means that SCWA would not implement a regional water conveyance and storage project to serve recycled water to the project area. Because no project construction or operational activities would occur, there would be no impacts related to noise as a result of implementation of Alternative 1.

Alternative 2 - Entire NSCARP

Impact NOI-1: Construction or operation of the NSCARP may generate noise levels in excess of standards established in the local general plan, noise ordinance, or applicable standards of other agencies.

Discussion:

Construction. Noise impacts from NSCARP construction activities are a function of the noise generated by construction equipment, the location and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities.

The primary noise from the construction activities would be generated by vehicles and equipment involved in site clearing and grading, foundation preparation, facility construction, and finish work. Different equipment would be used for each stage and would have its own distinct noise characteristics. Representative sound levels for most common types of construction equipment and usage factors (National Cooperative Highway Research Program, 1999; U.S. Army CERL, 1978; and USEPA, 1971) were used to estimate construction noise levels. The usage factors represent the percentage of time that the equipment would be operating at full speed. Table 3.10-8 provides the noise data that are used in the assessment of construction noise during various stages of construction activities. The heavy construction equipment list is taken from Chapter 2 - Project Description.

Analysis of construction traffic noise scenarios is based on light, medium and heavy-duty truck trips assumed for the Air Quality Analysis modeling (see Section 3.3). The analysis of impacts related to construction traffic trips is analyzed in further detail in Section 3.14 - Transportation/Traffic.

Specific construction noise impacts were modeled for only NSCARP pump stations due to the infeasibility of modeling construction of pipelines and reservoirs over the large project area; however, peak-dBA levels are discussed. Pump station construction would be limited to specific areas with potential impacts on specific noise receptors (i.e., one residence located approximately 100 feet from a pump station, three residences located approximately 200 – 300 feet from a pump station, and five other sensitive receptors located approximately 500 feet from respective pump stations).

Table 3.10-8. Estimated Construction Equipment Noise Levels

Equipment[1]	Noise Levels at 50 Feet (dBA)
Dozer	88
Excavator	85
Elevating Scraper	89
Backhoe	84
Front End Loader	87
Water Truck	87
Tractor Trailer-20 CY	80
Crane	86
Compactor	82
Paver	85
Welding Machine	74
Generator	84
Jackhammer	88

1 Several equipment components not listed on this table are included for use in the project description. No dBA noise levels were found for these pieces of equipment; however, it should be assumed that they would generate noise levels in excess of established state and local noise standards.

Table 3.10-8. Estimated Construction Equipment Noise Levels (Continued)

Equipment[2]	Noise Levels at 50 Feet (dBA)
Concrete, asphalt and dump trucks	88
Bulldozer	85
Air Compressor	86
Drill Rig	88

Source: National Cooperative Highway Research Program, Mitigation of Nighttime Construction Noise, Vibrations, and Other Nuisances, 1999. U.S. Army Construction Engineering Research Laboratory, Construction Site Noise Control Cost-Benefit Estimating Procedures, 1978. U.S. Environmental Protection Agency, Noise from Construction Equipment and Operation, Building Equipment, and Home Appliances, 1971

Pipelines

Construction noise levels were identified based on the source cited above for Table 3.10-8, and would applicable to the construction of pipelines. Typical construction equipment noise levels are presented in Table 3.10-8. These construction activities would occur within the unincorporated portions of Sonoma County. Pipeline construction activities may occur in close proximity to rural and suburban residential areas and other sensitive receptors, such as parks and schools. According to the noise analysis for the IWRP EIR, projected construction-noise levels were estimated to potentially reach 93 dBA at a distance of 50 feet under a worst-case scenario (IRWP, 2003).

Because the pipelines would possibly be located in proximity to residential streets in the community of Geyserville, residential receptors could potentially be located within close proximity to the construction activity and be subject to construction noise levels of up to 93 dBA. This is the worst-case noise scenario because it is based on a situation where all construction equipment associated with these activities would occur simultaneously at a particular location. During construction, noise levels would fluctuate based on use of different pieces of equipment identified in Table 3.10-8.

Noise impacts would be unavoidable during hours of construction activity; however, mitigation measures (i.e. noise muffling and limitation of hours) would serve to alleviate the severity of impact. Furthermore, noise associated with pipeline construction would be temporary - anywhere from approximately two weeks to two months (at worst-case) for each sensitive receptor location according to the 100 to 400-foot per day construction rate. Noise would attenuate at about 6 dB per doubling of distance, although this is a conservative estimate. Using this conservative estimate, Table 3.10-9 summarizes worst-case peak-dBA noise estimates at various distances.

[2] Several equipment components not listed on this table are included for use in the project description. No dBA noise levels were found for these pieces of equipment; however, it should be assumed that they would generate noise levels in excess of established state and local noise standards.

Table 3.10-9. Peak-level Construction Noise Estimates – Pipelines and Reservoirs

Distance (feet)	dBA
50	93
100	87
200	81
400	75
6,500[1]	50

[1] Approximate distance

In quieter, more rural areas, noise levels at a sensitive receptor would attenuate to about 50 dBA at approximately 6,500 feet of distance to construction activity. In more developed areas, it would take less time and less distance for noise levels to attenuate to ambient levels, as they are generally much higher than quiet, rural areas. It is important to note that these noise levels would fluctuate lower depending on the stage of construction at any location. The estimates noted in Table 3.10-9 would also apply to the reservoirs component.

Reservoirs

Construction noise levels have been estimated for reservoir construction. Equipment noise levels are presented in Table 3.10-8, with peak-level noise estimates presented in Table 3.10-9. The facilities would be located within the unincorporated portion of the County. Construction activities may occur in close proximity to rural residential areas and other sensitive receptors. Construction noise levels for storage reservoirs would be 93 dBA at 50 feet (see Table 3.10-9). This is a worst-case noise scenario because it is based on a situation where all construction equipment associated with each of these activities would be operated simultaneously at a particular location. This maximum noise level may occur during excavation activities.

During construction, noise levels would fluctuate with use of different pieces of equipment. Projected noise levels within the immediate vicinity of construction activities are expected to exceed the 50 dBA Leq daytime noise limit for 30-60 minutes per hour durations or greater; however, the proposed reservoirs are located in rural and semi-rural areas without sensitive noise receptors in close proximity. Furthermore, construction hours would be limited to the hours of 7:00 a.m. to 7:00 p.m. Other standard noise-reducing mitigation measures, such as muffled engines, would also be implemented.

Pump Stations

Construction activities associated with pump stations would include clearing of underbrush and rough and final grading of the site. Each pump station would be built with underground piping, structural slabs and foundations, electrical work, aboveground piping, and other building elements to house booster and distribution pump housings.

Pump stations would typically be constructed in areas with few nearby residential noise receptors. According to ambient noise field measurements taken on 12/14/05 and 12/15/05, one pump station site has a residence located approximately 100 feet away, with several other sites having residences located approximately 500 feet away. During construction, noise levels would fluctuate depending on the use of different pieces of equipment. Projected noise levels are expected to substantially exceed the 50 dBA Leq daytime noise limit standard. At the Klein #1 pump station site, the ambient Leq A reading measured 59.2 dBA, which is above the 50 dBA local noise standard.

Equipment assumptions were taken from the Air Quality Analysis (see Section 3.3 Air Quality). The Klein #1 pump station, located approximately 100 feet from an existing residence was modeled, along with a proposed pump station located approximately 500 feet from a residence. Three other residences are located approximately 200 to 300 feet from pump stations and thus, would fall within the modeled dBA range. Table 3.10-10 summarizes noise levels from construction activities for NSCARP pump stations.

Table 3.10-10. Construction Noise Impacts - Pump Stations

Distance (feet)	Leq dBA	CNEL (dBA)
100	82	79
500	65	61

Construction noise at pump stations with residences in the vicinity was modeled, with results in both Leq A and CNEL summarized in Table 3.10-9. Pump stations were modeled because of the point-source nature of the construction-noise impact and; thus, can be more accurately represented than reservoir construction, which would be spread out over a larger area. At distances of approximately 100 feet and 500 feet from nearby residences, construction noise would exceed noise standards and create a significant, although temporary, impact. Standard construction noise mitigation would help to minimize construction noise impacts for pump stations to a less than significant impact.

Construction Traffic

Construction traffic from the NSCARP may impact residences and other sensitive receptors, particularly those located along roadways, depending upon the exact site and nature of the construction activity. The daily traffic volume associated with construction of each project facility would primarily include worker vehicles traveling to and from the construction site with heavy-duty trucks hauling construction equipment and materials. Construction activities would occur in rural and some suburban areas of the NSCARP area.

Pipeline construction activities would potentially occur in close proximity to residences located in unincorporated areas of the County and in or near the communities of Healdsburg and Geyserville. Most pipeline construction work would occur along county roads and local arterial roadways. It is anticipated that construction would occur in quiet areas where ambient noise levels could be as low as 40 to 50 dBA during daytime

(IRWP, 2003). Therefore, traffic noise levels in the immediate vicinity of construction activity could potentially exceed existing ambient noise levels in these quiet, rural areas.

Generally, a doubling of traffic along a specific roadway segment is needed to result in an audible noise level change. However, approximately 30 to 40 construction trips (worker vehicles and heavy duty trucks) for each component would occur per day and, thus, would not result in a doubling of traffic along pipeline routes (see Section 3.14 – Transportation/Traffic). Therefore, there would not be an audible noise-level change along pipeline routes.

Pump station construction activities may occur in close proximity to residential receptors located in the unincorporated portions of the County; however, construction traffic would be confined to a smaller area than for pipelines and would not involve substantial vehicle traffic along adjacent roadways. The same would apply to reservoir construction. Furthermore, no sensitive receptors are located in close proximity to reservoirs. Traffic generated by construction activities at pump stations and reservoirs would generally be restricted to trips to and from specific work sites (see Section 3.14 - Transportation/Traffic).

Overall, construction traffic would result in significant but mitigatible, noise impacts. Of the three NSCARP components (i.e. reservoirs, pump stations, pipelines), pipeline construction would have the greatest potential to significantly affect nearby residences and other sensitive noise receptors. Noise reduction measures from Mitigation Measure NOI-1 would mitigate construction noise impacts to a less than significant level. Furthermore, impacts to individual sensitive noise receptors would be temporary in nature and would cease upon completion of construction.

Operation and Maintenance. Operation and maintenance activities would not involve the use of noise-producing equipment that could cause a substantial increase in ambient noise levels.

No substantial increase in ambient noise levels would result from the operation and maintenance of pipeline systems. Any noise produced by pipeline appurtenances, such as air relief valves, would be essentially immeasurable at distances more than a few feet from the valve. Maintenance activity noise levels may include temporary emergency repairs; however, such repairs would be very short term and typically exempt from local ordinances. Therefore, the operational impact of the pipelines would be less than significant.

There would be no sources of noise resulting from the operation and maintenance of reservoir facilities that could cause a substantial increase in ambient noise levels. Any noise produced by reservoir appurtenances would be essentially immeasurable outside of the reservoir site. Traffic generated by maintenance activities would be minimal and have a negligible effect on traffic noise in the project area.

Operational noise impacts for pumping stations were modeled (see Appendix H) with a spreadsheet that uses USEPA reference values, calculates geometric divergence at a rate of 6 dBA per doubling of distance, subtracts ground attenuation, and adds various noise sources together. Hours of operation were assumed to be from 7 a.m. to 7 p.m.

(daytime hours). The total Leq during normal operations at the residences in the range of approximately 100 feet to 500 feet from pump stations are summarized in Table 3.10-11.

A 76 dBA reference value at 50 feet was used for pumps as identified by Bolt, Beranek and Newman for the USEPA Office of Noise Abatement and Control (1971).

Table 3.10-11. Pump Station Operational Noise Levels

Distance (feet)[1]	Leq A[2]	Attenuated CNEL[3]
100	69	52
500	36	41

Notes:

1 Approximated

2 Estimated CNEL = 66 dBA at 100 feet; 55 at 500 feet.

3 Attenuation level (in CNEL) is based on 14 dBA reduction in noise output using masonry building materials, and is subtracted from CNEL.

Operational noise from the Klein #1 pump station would slightly exceed the 50 dBA daytime noise standard; however, an attenuated CNEL of 52 dBA would not constitute a significant and unavoidable impact as the existing Leq dBA ambient noise measurement taken on 12/15/06 was 59.2 dBA. Therefore, the standard would not be exceeded by operation of the pump station. Nevertheless, noise-controlling mitigation measures shall still be implemented to ensure that there would not be a greater than 5 dBA increase over ambient noise levels and would mitigate impacts to a less than significant level.

Operational noise impacts as result of implementation of the NSCARP are considered less than significant with mitigation, whereas construction noise impacts, although temporary in nature, would exceed County noise standards identified in the 1989 General Plan and create a significant impact. Mitigation Measure NOI-1 would reduce construction noise impacts to a less than significant level.

Impact Category: Significant but Mitigatible

CEQA Threshold of Significance Criteria: 1, 4

Mitigation Measure NOI-1:

A. The SCWA shall ensure that noise disturbances at sensitive receptors during construction activities are reduced, per the County of Sonoma's General Plan Noise Element standards and the State Office of Noise Control Construction Noise Limits, to the extent feasible. Measures may include:

- Equipment with improved noise muffling shall be used, and manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators, shall be intact and operational;

- Construction equipment shall require weekly inspection to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding, etc.);

- Wherever possible, hydraulic tools shall be used instead of pneumatic impact tools;

- Construction activities shall be limited to the hours between 7:00 a.m. and 7:00 p.m.;

- Where feasible, heavy truck trips shall be routed over streets or roads that will cause the least noise disturbance to residences or businesses in the vicinity of the construction activity;

- Where feasible, construction staging areas, maintenance yards, and other construction-oriented operations shall be located to limit potential impacts to sensitive receptors; and,

- Significantly affected sensitive noise receptors shall be specifically identified and notified in advance to keep windows and doors closed during peak construction activity.

B. A qualified noise engineer shall assist in the final design of the pump stations. In general, the locations of the pump stations are not in close proximity to sensitive noise receptors; however, at least one station has a residence approximately 100 feet, with four others approximately 500 feet away. Standard noise-reducing measures as part of design specifications may include:

- Noise barriers erected of concrete, masonry, noise control panel, earth berm or other noise-absorbing materials;

- Openings, such as for ventilation and doors, that face away from the sensitive receptors;

- Exterior doors constructed of metal assemblies which are weather-stripped to form an airtight seal when closed;

- Acoustical louvers may be used for the pump station housing air ventilation openings. As an alternative to the acoustical louvers, the SCWA may utilize an air intake/exhaust plenum (“L” shaped structure) as part of the final engineering design of the pump stations;

- Low-noise pumps;

- Water-cooling of pumps; and,

- Walls of pump stations made of sound insulating materials such as masonry.

Impact after Mitigation: Less than Significant. Operational noise impacts from the Klein #1 pump station would not be reduced below the 50 dBA threshold; however, noise-reducing measures would be implemented at this station to ensure that noise levels would not increase by 5 dBA or more over the ambient noise level (59.2 dBA) at this site. The addition of the pump station noise to ambient noise levels would not be detectable, and thus, would be less than significant with implementation of Mitigation Measure NOI-1.

Impact NOI-2: NSCARP construction activities may result in generation of excessive ground-borne vibration levels.

Discussion: Because no blasting activity is proposed as part of reservoir or pump station construction, there would be no impacts resulting from construction of these facilities. For pipeline construction, if sensitive receptors are located adjacent to construction equipment, vibration may create impacts. Heavy trucks and equipment can generate ground-borne vibrations that vary depending on vehicle type, weight, and road conditions.

As shown in Table 3.10-12, use of heavy equipment (e.g., a large bulldozer) generates vibration levels of 0.031 PPV or 81 RMS at a distance of 50 feet. Any impacts would be temporary in nature and would attenuate very quickly with distance from construction activity. Vibration levels at nearby receptors would not exceed the potential building damage threshold of 0.5 PPV. However, vibration levels would slightly exceed the annoyance threshold of 80 RMS.

Table 3.10-12. Vibration Velocities for Construction Equipment

Equipment	PPV at 50 ft (inches/second)[a]	RMS at 50 ft (dbA)[b]
Large bulldozer	0.031	81
Drilling rig	0.031	80
Loaded trucks	0.027	80

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, April 1995.
[a]Fragile buildings can be exposed to ground-borne vibration levels of 0.5 PPV without experiencing structural damage.
[b]The human annoyance response level is 80 RMS.

Ground-borne vibration attenuates quickly with distance and the RMS level from heavy equipment would be approximately 79 RMS at 60 feet. The majority of construction activity would be more than 60 feet from sensitive receptors given typical setbacks of the sensitive receptor structures from the property lines. In addition, construction activity would occur during the less sensitive daytime hours when sensitive receptors would be affected the least. Given the intermittent use of heavy-duty construction equipment and the increasing sensitive receptor distance from construction activity, the construction vibration impact would be marginally significant. However, the following mitigation is provided to reduce human annoyance from construction vibration to those living or working in the vicinity of the NSCARP.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 2

Mitigation Measure NOI-2: Construction contractors selected by the SCWA shall utilize techniques that minimize ground-borne vibration (e.g., locate equipment as far away from sensitive receptors as feasible and avoid operating multiple pieces of equipment simultaneously near sensitive receptors) to the greatest extent feasible. These measures shall be incorporated into project specifications prior to commencement of construction.

Impact after Mitigation: Less than Significant. With the incorporation of Mitigation Measure NOI-2, impacts from ground-borne vibration would be less than significant.

Impact NOI-3: Operation of the NSCARP may cause a substantial permanent increase in ambient noise levels above existing noise levels in the project vicinity.

Discussion: Operation of pipelines does not require mechanical facilities and would not generate measurable noise levels. Any noise produced by pipeline appurtenances, such as air relief valves, would be essentially unmeasurable at distances more than a few feet away.

Operation of reservoirs would not generate measurable noise levels as there would be no sources of noise resulting from the operation and maintenance of storage facilities that would cause a substantial increase in ambient noise levels. The project would involve the passive storage of water. Any noise produced by reservoir appurtenances would be essentially unmeasurable outside of the reservoir site; therefore, the operational impact would be less than significant.

Pump stations are proposed in rural areas within the project area. Ambient noise levels in rural areas typically range from about 40 to 50 dBA during the daytime and 25 to 35 dBA during the nighttime. Pump stations would typically operate during daytime hours (i.e. between 7 a.m. and 7 p.m.). Twenty-four hour pump operation may occur in isolated circumstances. One of these pump stations would be located approximately 100 feet from a residence, three approximately 200 to 300 feet away, with five others approximately 500 feet away from sensitive noise receptors.

It is anticipated that noise from new pump stations would not substantially exceed existing ambient noise levels at most sensitive receptors; however, the noise levels at one nearby residence (at Klein #1) is expected to slightly exceed the applicable noise standards for Sonoma County (see Impact NOI-1). Operational noise levels would be mitigated by using noise-reducing building materials.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 3

Mitigation Measure NOI-3: Implement Mitigation Measure NOI-1

Impact after Mitigation: Less than Significant. With the incorporation of Mitigation Measure NOI-3, impacts from permanent noise increases would be less than significant.

Impact NOI-4: NSCARP potentially will expose people to noise in the vicinity of a public or private airport

Discussion: The NSCARP involves use of recycled water for agricultural irrigation, and does not include facilities for human occupancy; therefore, it would not expose residents to excessive noise from airport operations. As such, there would be no impact. However, Sonoma County Airport may expose pipeline construction workers to noise from airport operations. This could result in a potentially significant impact.

Impact Category: Significant but Mitigable

Threshold of Significance Criterion: 5

Mitigation Measure NOI-4: SCWA shall assure all construction workers at the airport will comply with hearing protection measures. This would reduce the potential for permanent hearing loss and reduce the potential impact to less than significant levels.

Impact after Mitigation: Less than Significant. With incorporation of Mitigation Measure NOI-4, noise impacts to workers would be less than significant.

Alternative 3 - Alexander Valley-Jordan Reservoir Subset

This alternative represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C reservoirs. Pump station sites would be limited to the Jordan Reservoir site.

Potentially significant impacts would be similar to Alternative 2; however, no pump stations would located in proximity of approximately 500 feet or closer to any sensitive noise receptors. Impacts from construction noise would still occur, but would impact a smaller geographic area; therefore, mitigation measures being applied to Alternative 2 would be implemented for Alternative 3 to lessen impacts from construction noise to the extent feasible.

Alternative 4 - Russian River-Westside Subset

This alternative represents a scaled-down version of the Russian River Valley subarea by limiting storage reservoir development to the Russell, Russell-Bucher, Becnel, and Gallo Twin Valley reservoirs. Pump stations would include the Russell, Russell-Bucher, and Gallo Twin Valley sites.

Potentially significant impacts would be similar to Alternative 2; however, no pump stations would located in proximity of approximately 500 feet or closer to any sensitive noise receptors. Impacts from construction noise would still occur, but would impact a smaller geographic area; therefore, mitigation measures being applied to Alternative 2 would be implemented for Alternative 4 to lessen impacts from construction noise to the extent feasible.

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3.11 POPULATION AND HOUSING

This section evaluates the potential of the Proposed Project to induce substantial population growth and to displace a substantial number of existing housing units or people, necessitating the construction of replacement housing.

3.11.1 Physical Setting

Sonoma County is located north of San Francisco, bounded by Marin County to the southwest, San Pablo Bay on its southern tip, Napa and Lake counties to the east, Mendocino County to the north, and the Pacific Ocean on the west. Much of the County is rural, but its population grew by 18.1 percent between 1990 and 2000 (from 388,222 to 458,614). It has continued to grow, which was reflected in the 2004 population for Sonoma County of 468,450 persons (U.S. Census Bureau, 2005). Most of this growth is centered on the U.S. Highway 101 corridor that runs north and south through the middle of the County.

The County is experiencing a higher rate of job growth than predicted in the 1989 County General Plan, and this is directly correlated with an increased pressure for additional housing. The County General Plan projected countywide employment to be 171,900 jobs in 2000, but the State Employment Development Department estimated employment as of November 2000 at 195,900 jobs (Sonoma County General Plan Update Status Report, 2006). Within Sonoma County, the median household income in 2000 was $53,076 (U.S. Census Bureau, 2005).

Sonoma County contains 188,180 housing units, with a vacancy rate of 8.4 percent and a 64.1 percent owner-occupancy rate (U.S. Census Bureau, 2005). The median value of owner-occupied housing units in 2000 was $273,200 (U.S. Census Bureau, 2005).

3.11.2 Regulatory Setting

Local Jurisdiction Regulation

The Housing Element of the Sonoma County General Plan identifies several goals, objectives, and policies related to population and housing in the County. The proposed project does not propose the construction of new housing, require an increase in the need for housing, or displace any housing or people or induce growth. As shown in Table 3.9-3, one policy contained within the Housing Element is applicable to the NSCARP.

3.11.3 Methodology

A review of the Sonoma County General Plan Housing Element was conducted to determine project consistency with applicable goals, objectives, and policies. In addition, review of site plans (including general pipeline alignment and potential reservoir siting) was conducted to determine the project's potential for displacing homes or people.

3.11.4 CEQA Thresholds of Significance Criteria

The evaluation criteria for Population and Housing impacts are presented in Table 3.11-1. These criteria are drawn from CEQA requirements and supplemented with applicable goals, objectives, and policies from the Sonoma County General Plan. Population and Housing impacts would be considered significant if the project induced substantial population growth or displace substantial numbers of existing housing or people.

Table 3.11-1. CEQA Evaluation Criteria/Thresholds of Significance

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will the NSCARP induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	Need for new home construction or extension of infrastructure to service new home construction.	Substantial new homes requiring construction. Major new infrastructure to service new home construction.	CEQA Guidelines Appendix G, Checklist Item XII(a)
2. Will the NSCARP displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	Numbers of houses displaced requiring replacement.	Greater than 0 houses displaced.	CEQA Guidelines Appendix G, Checklist Item XII(b)
3. Will the NSCARP displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	Numbers of people displaced requiring construction of replacement housing.	Greater than 0 people displaced.	CEQA Guidelines Appendix G, Checklist Item XII(c)

3.11.4 Alternatives Analysis

Alternative 1 – No Project/Action

Under the No Project Alternative, the Proposed Project would not be built. Potential impacts associated with population and housing would not occur under the No Project Alternative. Implementation of the No Project Alternative would result in a continuation of existing irrigation practices and would not result in an extension of infrastructure, and would not necessitate the construction of new homes or provide service to new homes.

Because the No Project Alternative would result in no change to existing conditions, this impact is considered less-than-significant. No mitigation is required. The No Project Alternative, however, would not meet the goals and objectives of the NSCARP.

Alternative 2 – Entire NSCARP

Impact POP-1: NSCARP would extend recycled water infrastructure within the project area.

> **Discussion:** Agricultural lands within the project area are currently irrigated with water originating from the Russian River and its tributaries or from groundwater wells. NSCARP would install approximately 112 miles of transmission pipeline and would provide recycled water for agricultural irrigation to approximately 21,100 acres of

presently developed agricultural lands within the project area. Although the proposed project would extend the recycled water infrastructure, these services would be used strictly for agricultural irrigation purposes and would not be used as a new source of water that would allow for new home development elsewhere within the County.

Though NSCARP would provide recycled water to be used in-lieu of potable water supplies, recycled water users who participate in NSCARP would not lose their existing water right, and their participation would not provide authorization for their existing water right to be used for other purposes or places of use not currently authorized. Therefore, NSCARP would not support additional population and housing because the proposed project would not result in increased flows in the Russian River and any water that remains in the tributaries as a result of this project would not be available for appropriation by someone else.

NSCARP would employ up to 50 workers throughout the construction period, and it is anticipated that the majority of workers would come from the Sonoma County area. Outside contractors, who would commute from outside of the County and stay at existing local hotels during construction, may also be used. There is an adequate supply of hotels and motels in the project area that could be utilized by the out-of-town personnel.

Project operation and maintenance may require up to four additional employees. Because the project would result in an increase in employment during operation and maintenance of only four employees, the project would result only in an incremental increase in demand for new housing.

Because the installation of recycled water pipelines, development of proposed and expanded reservoirs and construction of pump stations would not result in the need for new home construction, and because the proposed extension of infrastructure would not be utilized to service new homes, this impact is considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 1

Mitigation Measure: None required

Impact POP-2: NSCARP would have the potential to displace existing housing.

Discussion: The proposed pipeline alignments are generally along paved rights-of-way, although in several locations the alignments are on privately owned parcels. Alignments across private lands generally follow property boundaries and would not result in displacement of housing structures.

Proposed reservoir locations were evaluated based on topographic conditions at the sites as well as potential geologic hazards. Similarly to proposed pipeline installation, proposed reservoirs (new and expanded) have been sited so as not to result in the displacement of existing housing structures.

Booster and distribution pump stations would be located adjacent to the proposed pipelines. Development of the booster and distribution pump stations would not result in the displacement of housing structures.

Because no housing structures would be displaced as a result of construction and operation of NSCARP, this impact is considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 2

Mitigation Measure: None required

Impact POP-3: NSCARP would have the potential to displace substantial numbers of people.

Discussion: The proposed pipeline alignments are generally along paved rights-of-way, although in several locations the alignments are on privately owned parcels. Alignments across private lands generally follow property boundaries and would not have the potential to displace of people.

Proposed reservoir locations were evaluated based on topographic conditions at the sites as well as potential geologic hazards. Similarly to proposed pipeline installation, development and expansion of the proposed reservoirs would not result in the displacement of people.

Booster and distribution pump stations would be located along the proposed pipelines alignment. Development of the booster and distribution pump stations would not result in the displacement of people.

Because NSCARP would not result in the displacement of people and would not require the construction of new housing, this impact is considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 3

Mitigation Measure: None required

Alternative 3 – Alexander Valley-Jordan Reservoir Subset

The study area for Alternative 3 is located in the same region as Alternative 2, but is smaller in scale. Alternative 3 would result in similar population and housing impacts as under Alternative 2 from construction of recycled water pipelines, storage reservoirs, and distribution and booster pump stations. However, total impacts would be less because considerably less recycled water pipelines would be constructed, as would only two reservoirs (Jordan A and Jordan C) and only one pump station.

Alternative 4 – Russian River Valley-Westside Subset

The study area for Alternative 4 is located in the same region as Alternative 2, but is smaller in scale. Alternative 4 would result in similar population and housing impacts as under Alternative 2 from construction of recycled water pipelines, storage reservoirs, and distribution and booster pump stations. However, total impacts would be less because considerably less recycled water pipelines would be constructed, only three pump station, as would only three new reservoirs (Russel-Bucher, Bucher, and Becnel #2 reservoir sites) and the existing Gallo Twin Valley Reservoir

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3.12 PUBLIC HEALTH AND SAFETY

3.12.1 Physical Setting

This section provides information regarding potential public health and safety impacts resulting from the NSCARP. Impacts may include exposure to chemical or micro-organisms in recycled water, exposure to hazardous materials or wastes, construction safety hazards, fire hazards, and disease transmission by mosquitoes. To provide a basis for this evaluation, the setting section describes the policies and regulations for use of recycled water, hazardous materials/waste storage and handling, construction safety, dam safety, fire safety, and mosquito control. Information is provided on existing water quality data for the Santa Rosa, ALWSZ, and Windsor facilities.

Materials and waste may be considered hazardous if they are poisonous (toxicity), can be ignited (ignitability), corrode other materials (corrosivity), or react violently, explode, or generate vapors when mixed with air (reactivity). The term "hazardous material" is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health or safety or to the environment[1]. Past industrial or commercial uses at a site can result in spills or leaks of hazardous materials and petroleum products that result in soil and groundwater contamination. Federal and state laws require that soils having concentrations of contaminants, such as lead, gasoline, or industrial solvents that exceed acceptable levels must be handled and disposed of as a hazardous material during excavation, transportation, and disposal.

The NSCARP area is a mixture of open space and farmland with rural land uses occupying much of the area. Often rural land uses involving hazardous materials and other substances can become a health hazard to humans or the environment if not properly contained or managed. Rural land uses in the area include farming, ranching, and wine production operations that use petroleum fuels, pesticides, and fertilizers. These uses can include storage of bulk quantities of diesel and gasoline for equipment in aboveground and underground storage tanks that are often unregistered and do not comply with current fuel tank regulations[2]. Farms, ranches, and wineries can also operate unregulated, private refuse dumps in remote areas. A wide array of potential hazardous materials sources originate from urban land uses and can include soil and groundwater contamination from gasoline service stations, releases from industrial operations that rely on solvents or other caustic and poisonous chemicals, and other hazardous material handlers. These rural and urban sources of hazardous materials are present in the existing environment within the project area.

Water Use, Recycling, and Discharge

Water Use

The largest public water systems in the NSCARP area are the SCWA and the municipal systems operated by Cloverdale, Healdsburg, and Windsor. There are numerous smaller

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1 State of California, Health and Safety Code, Chapter 6.95, Section 25501(o).

2 Underground storage tanks less than 1,000 gallons and above ground storage tanks are exempt from recent petroleum storage regulations.

systems operated by private companies that supply individual businesses or developments (e.g., restaurants, vineyards, apartment complexes, trailer parks). The systems in the study area rely primarily upon the Russian River or groundwater as the source of water.

NSCARP Recycled Water Sources

The three sources of recycled water for NSCARP would be: (1) the Santa Rosa's Laguna wastewater treatment plant (WWTP); (2) the SCWA's ALWSZ WWTP; and, (3) the town of Windsor's WWTP. All three of these facilities currently produce disinfected tertiary-treated recycled water that is used in accordance with Title 22 regulations. Table 3.12-1 provides a summary of chemical constituents detected in Santa Rosa's recycled water. Table 3.12-2 provides data that were collected in 2005 from the Windsor WWTP and the ALWSZ WWTP; at both treatment plants, the recycled water distribution systems are monitored monthly and tested for both total coliform and e-coli bacteria. The listed constituents are taken from the most recent water quality samplings.

Table 3.12-1. Summary of Chemical Constituents Detected in Santa Rosa's Recycled Water

Chemical Constituent	1996 Data for Fresh Effluent(1)		2002 Data for Fresh Effluent (2)	
	Max	Mean	Max	Mean
INORGANICS				
Aluminum	0.15	0.03	0.15	0.032
Ammonia	40.3	4.1	12	0.6
Arsenic	0.004	0.002	0.003	0.0018
Barium	0.11	0.02	0.11	0.023
Boron	0.6	0.48	0.6	0.47
Chromium	0.014	0.002	ND (3)	ND
Copper	0.04	0.01	0.014	0.0086
Fluoride	0.31	0.22	0.2	0.2
Lead	0.012	0.005	0.0058	0.0019
Mercury	0.0002	0.0001	ND	ND
Nickel	0.01	0.004	0.0073	0.0034
Nitrate (4)	50.5	16.3	16	7.3
Nitrite (4)	7.3	0.3	2.3	0.18
Silver	0.01	0.001	ND	ND
Zinc	0.28	0.03	0.035	0.027
ORGANICS				
Cyanide	0.03	0.01	0.016	0.0044
1,4-Dichlorobenzene	0.0009	0.0006	0.0006	0.00034
Endosulfan II	0.00001	0.00001	0.00008	0.000028
Lindane (-BHC)	0.00009	0.00002	0.00002	0.00002

Table 3.12-1. (Continued)

Chemical Constituent	1996 Data for Fresh Effluent(1)		2002 Data for Fresh Effluent (2)	
	Max	Mean	Max	Mean
ORGANICS				
Methyl *tert* -butyl ether (MTBE)	NA(4)	NA	0.0018	0.00093
Naphthalene	ND	ND	0.0075	0.0046
Disinfection By-Products				

Source: Parsons Engineering Science, Inc. 1996; Merritt Smith Consulting 2002.

Notes:
(1) Data collected between 1988 and 1995.
(2) Data collected between December 1997 and April 2002.
(3) ND - not detected
(4) NA - not analyzed
(5) As nitrogen.

Table 3.12-2. Summary of Chemical Constituents Detected in Recycled Water

Chemical Constituent	California Drinking Water MCL (2)	ALWSZ	WINDSOR
		Recycled Water Quality 2005	Recycled Water Quality 2005
Microbiological			
Total Coliform Bacteria	Present/Not Present	<2 MPN (1)	<2 MPN
Fecal Coliform and E.Coli	Present/Not Present	<2 MPN	<2 MPN
Physical and Mineral Constituents (mg/l)			
Nitrate (as Nitrate)	45	7.3	30
Nitrate (as Nitrogen)	10	7.5	<4
Constituents			
Hardness (mg/l)	MCL N/A (3)	138	140
Iron (mg/l)	0.3	0.1	<0.1
Sodium (mg/l)	MCL N/A	67.4	100
Chloride (mg/l)	250	123	90
Sulfate (mg/l)	250	34	65
Total Alkalinity (mg/l)	MCL N/A	117	140
TDS (mg/l)	500	442	420
pH (pH)	MCL N/A	7.8	7.7

Source: Airport-Larkfield- Wikiup Sanitation Zone, 2005; Windsor, 2005

Notes:
1. MPN= Coliform Most Probable Number Per 100ml
2. MCL= Maximum Contaminant Level
3. MCL N/A= Department of Health Services has not issued an MCL for these constituent

Future NSCARP Recycled Water Sources

Future sources of recycled water for NSCARP may include: (1) the City of Healdsburg's facility; (2) the City of Cloverdale's facility; and, (3) the Geyserville Sanitation Zone facility. These three facilities treat to a secondary level, not tertiary level. Therefore, these three facilities would not be considered as a source of recycled water for NSCARP until plant upgrades are completed and the water is treated to a tertiary level. At that time, it is possible that water from these facilities could be made available for NSCARP. The City of Healdsburg is currently constructing a new wastewater treatment facility with tertiary-level treatment.

3.12.2 Regulatory Setting

Federal

Resource Conservation and Recovery Act

Under the federal Resource Conservation and Recovery Act (RCRA), individual states may implement their own hazardous waste programs in lieu of the RCRA as long as the state program is at least as stringent as federal RCRA requirements, and is approved by the USEPA. The USEPA approved California's RCRA program, called the Hazardous Waste Control Law (HWCL), in 1992. Cal EPA and DTSC, a department within Cal EPA, regulate the generation, transportation, treatment, storage, and disposal of hazardous waste. DTSC has primary hazardous materials regulatory responsibility, but can delegate enforcement responsibilities to local jurisdictions that enter into agreements with DTSC for the generation, transport, and disposal of hazardous materials under the authority of the HWCL.

Toxic Substance Control Act

The Toxic Substances Control Act (TSCA) of 1976 was enacted by Congress to give the USEPA the ability to track the 75,000 industrial chemicals currently produced or imported into the United States. The USEPA repeatedly screens these chemicals and can require reporting or testing of those that may pose an environmental or human-health hazard. The USEPA can ban the manufacture and import of those chemicals that pose an unreasonable risk.

State

California Code of Regulations

The California Code of Regulations (CCR), Title 22, Section 66261.20-24 contains technical descriptions of characteristics that would classify a soil as a hazardous waste. When excavated, soils having concentrations of contaminants higher than certain acceptable levels must be handled and disposed as hazardous waste.

California Hazardous Materials Release Response Plans and Inventory Law

The California Hazardous Materials Release Response Plan and Inventory Law of 1985 (Business Plan Act) requires that businesses that store hazardous materials onsite prepare a business plan and submit it to local health and fire departments. The business plan must include:

- Details of the facility and business conducted at the site;
- An inventory of hazardous materials that are handled and stored onsite;
- An emergency response plan; and,
- A safety and emergency response training program for new employees with an annual refresher course.

California Occupational Safety and Health Administration

In California, the California Occupational Safety and Health Administration (Cal OSHA) regulates worker safety similarly to the federal OSHA. OSHA has developed worker safety regulations for the safe abatement of lead-based paint and primers (Lead in Construction Standard, Title 8 CCR 1532.1).

Unified Hazardous Waste and Hazardous Materials Management Regulatory

Program

In January 1996, Cal EPA adopted regulations that implemented a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The program has six elements: (1) hazardous waste generators and hazardous waste onsite treatment; (2) underground storage tanks (USTs); (3) above-ground storage tanks (ASTs); (4) hazardous materials release response plans and inventories; (5) risk management and prevention programs; and (6) Unified Fire Code hazardous materials management plans and inventories. The plan is implemented at the local level and the agency responsible for implementation of the Unified Program is called the Certified Unified Program Agency (CUPA).

In Sonoma County, the Department of Emergency Services, Hazardous Materials Division is the designated CUPA.

Construction Hazards

Hazards associated with construction activities can affect the safety of both workers and the general public. The safety of workers is regulated by the California Department of Industrial Relations, which receives its authority from Title 8 of the California Code of Regulations. These regulations also indirectly protect the general public by requiring construction managers to post warning signs, to limit public access in construction areas, and to obtain permits for work considered to present a significant risk of injury (e.g., excavations greater than five feet into which a person is required to descend).

Where excavations or other NSCARP activities would occur in public rights-of-way, an encroachment permit is required from the appropriate agency such as the California Department of Transportation for state highways, Departments of Public Works for roadways within cities, or the Sonoma County Department of Public Works or Office of Emergency Services for county roads. These permits are designed to protect the public by providing a system of notification to providers of emergency or other important services of road closures. Compliance with these requirements would minimize the safety and health hazards associated with construction activities.

Fire Safety

Fires are extremely costly, not only to property owners and residents, but also to local agencies. They pose a serious threat to the preservation of the public peace, health, or safety. Wildland fires burn natural or wild vegetation located on undeveloped lands. At the urban/wildland interface, the fire hazards increase because most fires are caused by human activities such as smoking, debris burning, and equipment operation.

Between 1965 and 1984, there were 42 fires of 100 acres or more in Sonoma County (Sonoma County, 1989). The California Department of Forestry (CDF) classifies the fire potential for wildlands based on three factors: fuel load, climate, and topography. The NSCARP encompasses some areas where these factors combine to present a high risk of fire. According to the CDF's Fire Hazard Disclosure and Fuel Rank Maps for Sonoma County, portions of the NSCARP area are within areas that are rated as containing "substantial forest fire risks and hazards" or "very high fire hazard severity zones" (CDF, 2000 and 2002). The hilly areas north and west of Healdsburg that are designated for agricultural irrigation are rated as areas with a substantial risk of forest fires. Property owners in a very high severity zone must maintain a defensible space (e.g., remove brush that could serve as fuel) according to the requirements of the California Government Code §51182.

Mosquito Control

Mosquitoes are both pests and vectors of disease to humans and animals. Mosquito populations can increase rapidly, especially over summer months. Several mosquito species have the potential to breed and to reproduce as a result of the construction and operation of NSCARP components (e.g., storage reservoirs and irrigation areas).

The California Health and Safety Code provides authority for mosquito abatement districts to advise and control mosquito production on private and public lands and to assess the land owner for the cost of that control. The districts also have the authority to hold hearings and assess civil penalties to abate nuisance and potential health threats to the general public (California Health and Safety Code §2270-2294). The Marin/Sonoma Mosquito Abatement District (Abatement District) and the Vector Biology and Control Branch of the DHS are responsible for overseeing the mosquito prevention program within the NSCARP area. The primary objective of the Abatement District is to suppress the mosquito population below the threshold level required for disease transmission or nuisance tolerance level.

The Abatement District has produced several documents addressing mosquitoes and other biting arthropods associated with wastewater-recycling or disposal projects. These documents provide project design criteria for mosquito prevention as well as guidelines for proper management of wastewater recycling or disposal projects. The design criteria include minimizing the amount of over-irrigation, ponding, or tail water, thereby significantly reducing the need to treat these sites with pesticides and the subsequent need to provide the Abatement District with compensation for that control effort.

Recycled Water

To ensure an appropriate level of treatment for protection of public health from pathogenic organisms, the DHS has established treatment requirements for a variety of recycled water uses (Title 22, California Code of Regulations, §60301 et seq.). These conventional and widely practiced water and wastewater treatment processes are believed to be capable of reducing pathogenic constituents to acceptable levels. The DHS updated the State's recycled water regulations in November 2000.

Title 22 criteria for recycled water are intended to prevent transmission of disease by: skin contact, ingestion, or inhalation of infectious agents in water or by direct contact with a contaminated object. Recycled water must be treated to an appropriate level to protect surface water and to prevent transmission of pathogens through aerosols (small particles of water suspended in air) from spray irrigation. The level of treatment varies with the ultimate use of the recycled water. At minimum, wastewater must receive secondary treatment prior to use as recycled water (see Table 3.12-3). Those uses with the highest potential for human exposure are permitted to use only disinfected tertiary-treated recycled water. A summary of primary and secondary maximum contaminant levels for chemical constituents detected in recycled water is provided in Table 3.12-4.

Table 3.12-3. Categories of Recycled Water as Defined in California's Recycled Water Regulations

Recycled Water Category	Definition
Disinfected Tertiary Recycled Water	Filtered and subsequently disinfected wastewater that meets the following criteria: (a) The filtered wastewater has been disinfected by either: A chlorine disinfection process following filtration that provides a CT value (the product of total chlorine measured at the same point) of not less than 450 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, base peak dry weather design flow; or a disinfection process that, when combined with the filtration process, has been demonstrated to inactivate and/or remove 99.999 percent of the plaque-forming units of F-specific bacteriophage (b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters.

Table 3.12-3. (Continued)

Recycled Water Category	Definition
Disinfected Secondary-2.2 Recycled Water	Recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period..
Disinfected Secondary-23 Recycled Water	Recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed an MPN of 23 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 240 per 100 milliliters in more than one sample in any 30 day period.
Undisinfected Secondary Recycled Water	Oxidized wastewater in which the organic matter has been stabilized, is nonputrescible and contains dissolved oxygen.

Table 3.12-4. Summary of Primary and Secondary Maximum Contaminant Levels for Chemical Constituents Detected in Recycled Water[1]

Chemical/Constituent	MCL (mg/L)	Chemical/Constituent	MCL (mg/L)
Nitrate (4)	10	Silver	0.1
Nitrite	1	Sulfate	250
		Zinc	5
Organics	**MCL (mg/L)**	**Radioactivity(6)**	**(pCi/L)**
Cyanide	0.2	Gross Alpha particle activity(7)	15
1,4-Dichlorobenzene	0.005	Gross Beta particle activity	50
Endosulfan II	N/A		

Source: Title 22, California Code of Regulations, §64431-64444

Notes:
(1) The Decrease of the State or federal value is listed.
(2) Arsenic MCL must be met by January 2006.
(3) Action level.
(4) As nitrogen.
(5) N/A – not applicable
(6) pCi/L, picoCuries per liter.
(7) Includes radium-226 but not radon and uranium. Gross alpha particle measurement may be substituted for measurement of radium-226 and radium-228

Nitrate and Nitrite

The primary health effect of elevated levels of nitrate and nitrite in drinking water is the induction of methemoglobinemia in infants (blue-baby syndrome). The drinking water standard and the health criteria are derived from human epidemiological studies that have reported health effects only at nitrate concentrations that exceed 10 mg/L nitrate (as nitrogen) in water. A small number of cases of methemoglobinemia have been reported in epidemiological studies for water containing 11 to 20 mg/L nitrate (as nitrogen) (coliform-contaminated well water may have been a complicating factor in these cases), although some clinical studies have reported no signs of methemoglobinemia for infants who received water containing up to 34.5 mg/L nitrate (as nitrogen). The 10 mg/L nitrate (as nitrogen) drinking standard is, therefore, believed to be fully protective of human health.

Trihalomethanes and Haloacetic Acids

Trihalomethanes and haloacetic acids are disinfection by-products (DBPs) that form when water containing naturally occurring organic matter is chlorinated to inactivate disease-causing microorganisms. Trihalomethanes include chloroform, bromodichloromethane, dibromochloromethane and bromoform; haloacetic acids include mono-, di- and tri-chloroacetic acids, and mono- and di-bromoacetic acids.

MTBE

MTBE has been added to gasoline to enhance octane ratings and to comply with Clean Air Act mandates. It was approved by the USEPA for use in 1979 and was added to gasoline during the 1980s at approximately two to five percent by volume as an octane booster. In 1992, it was blended at 10-15 percent by volume for use in some areas in the wintertime oxygenated fuel program. In 1996, it began to be used year-round at 11 percent by volume in the statewide-reformulated gasoline program (SWRCB, 2000). California initiated a ban on the use of MTBE in gasoline mixtures starting January 1, 2004.

Relative to other fuel hydrocarbons, MTBE has a high solubility in water. The compound has low retardation in groundwater aquifers, and is slow to biodegrade. These properties, combined with a high percentage in gasoline, cause the potential for high source area concentrations, long plumes in groundwater, and long residence times in the subsurface. It also has taste and odor characteristics that can impair water supplies at very low concentrations.

Endosulfan II

Endosulfan is a pesticide used to control various insects and mites on cereal, cotton, fruits, and vegetables. It is currently used in a number of commercial formulations that are allowed for use in California by the Department of Pesticide Regulation (CDPR).

Naphthalene

Naphthalene is a white solid that is found naturally in fossil fuels (e.g., diesel fuel and gasoline). It is also a major component of moth repellents.

Endocrine Disrupting Compounds

Recent scientific publications have suggested that endocrine disrupting compounds (EDCs) may be responsible for observed declines in the reproductive success and sexual development of wildlife and similar adverse health effects in humans. Researchers have proposed that these EDCs may induce their effects by disrupting the metabolism of the natural sex hormones of both males and females. Many of the chemicals that have been identified as potential EDCs are chlorine-based, such as dioxins, DDT, chlordane, lindane, or polychlorinated biphenyls (PCBs), although non-chlorine chemicals (detergents, synthetic estrogens, and some metals) have been identified as well.

The USEPA and other regulatory agencies have not developed new standards or adjusted existing standards to address the endocrine effects of potential EDCs at low concentrations because scientific research into this phenomenon is relatively recent, and there is still much debate on whether it is appropriate to change or adjust the standards. Although exposure to EDCs has been suggested to play a role in adverse health outcomes, thus far there is no firm evidence of direct causal associations between low-level exposures to EDCs and adverse health outcomes (IPCS, 2002).

However, the USEPA is currently addressing the situation by the Endocrine Disruptor Screening Program (EDSP), which is a two-tiered screening and testing process. In Tier 1, the USEPA hopes to identify chemicals that have the potential to interact with the endocrine system. In Tier 2, USEPA will determine the specific effect caused by each endocrine disruptor and establish the dose at which the effect occurs. This approach will enable USEPA to gather the information needed to identify endocrine disruptors and take appropriate regulatory action. The chemical selection for the initial round of Tier 1 screening began in September, 2005 to determine whether certain substances may have hormonal effects. Since the EDSP project is new and incomplete, it is not currently possible, using existing standards and/or regulatory agency risk assessment methodology, to evaluate the endocrine effects of these chemicals, if any, at the low concentrations reported in the City of Santa Rosa's Laguna WWTF effluent (USEPA, 2006).

Pharmaceutically Active Compounds and Xenobiotics

Chemicals used in disinfectants, prescription and non-prescription drugs, insect repellants, and foods (e.g., caffeine from coffee) have been detected in trace amounts in rivers and streams in the United States. These chemicals have been referred to collectively as "pharmaceutically active compounds" or "xenobiotics" (xeno = foreign, biotic = pertaining to life). The compounds enter rivers and streams mostly in discharges from wastewater treatment plants and animal production facilities. Although the term "xenobiotics" could apply to many compounds present in wastewater due to human activities, they are used here to refer to compounds, such as pharmaceuticals, hormones, and other organic contaminants, that have been detected by recent studies at very low concentrations (one part per billion or less) in streams and rivers in the United States.

The United States Geological Survey (USGS) recently collected and analyzed water samples from 139 streams that were considered susceptible to contamination by xenobiotics from various wastewater sources, such as those downstream from heavily urbanized areas or livestock production facilities (USGS, 2002). The USGS analyzed for 95 chemicals and found that one or more of the compounds were detected in 80 percent of the streams sampled.

Mixtures of chemicals were common; 75 percent of the streams had more than one compound, 50 percent had seven or more, and 34 percent had ten or more. The most frequently detected chemicals were cholesterol, coprostanol (a fecal sterol), N-N-diethyltoluamide (insect repellent), caffeine, triclosan (disinfectant), tri-(2-chlorethyl)-phosphate (fire retardant), and 4-nonylphenol (detergent metabolite, component of shampoo). Detergent metabolites, sterols, and plasticizers generally were detected at the highest concentrations.

Detection of xenobiotics at very low concentrations has been achieved by using relatively new laboratory methods, some of which were developed by the USGS for its study. The methods are not widely available at commercial laboratories that perform most wastewater analyses because they are new and because the target compounds are mostly unregulated (i.e., there is currently little demand for their analysis). Only about 15 percent of the chemicals (e.g., lindane) have drinking water standards or other human or ecological health criteria. In the USGS study, measured concentrations rarely exceeded any of the standards or criteria.

The ability to detect xenobiotics at very low concentrations has outpaced the scientific and regulatory communities' abilities to interpret whether the detected concentrations are a health hazard for humans. There is evidence, however, that the concentrations of some xenobiotics detected in streams and rivers are unlikely to cause health effects. Assuming that undiluted water from these streams or rivers would be used as a drinking water source and a standard intake of water from these sources (two liters per day, the amount widely used by regulatory agencies to determine regulatory standards), the ingested amounts of common drugs (e.g., those used in pain relievers and for birth control) are small fractions of their usual pharmaceutical and/or ambient doses from all sources.

For example, acetaminophen (the active ingredient in Tylenol) was detected in 24 percent of samples collected in the USGS study at an average concentration of 0.00011 mg/L and a maximum concentration of 0.010 mg/L. Using the maximum concentration, and assuming that a person drinks two liters of water per day, the maximum total intake would be 0.02 mg, well below the usual amount in nonprescription tablets (250 to 500 mg) and a dose that would cause adverse effects. Another common drug, 17-α- ethynylestradiol (a synthetic estrogen used for birth control), is also believed to be present at levels below those likely to cause human health concerns (Tsuchihashi, 2002). Nevertheless, there is uncertainty about the possible effects of mixtures of chemicals and the possibility of health effects from chemicals that have not yet been detected.

The USEPA and other regulatory agencies have not developed new standards or adjusted existing standards to address xenobiotics (other than those currently regulated) at very low concentrations because scientific research into this phenomenon is relatively recent, and there is still much debate on whether it is appropriate to change or adjust the standards. Although there is concern about the possible health effects of xenobiotics in wastewater, thus far, there is no firm evidence of direct causal associations between very low-level exposures to xenobiotics, such as pharmaceutically active compounds, and adverse health outcomes. Therefore, it is not currently possible, using existing standards and/or regulatory agency risk assessment methodology, to evaluate the health effects of these chemicals, which might be present at very low concentrations, if present at all, in the tertiary-treated effluent from the three WWTPs.

Biological Constituents

The effectiveness of disinfection, and thus the safety of recycled water with regards to pathogenic bacteria, viruses, and other micro-organisms, is generally assessed by analyzing effluent samples for total coliform bacteria.

Local

Refer to Section 3.9, Table 3.9.3 for a list of applicable goals, objectives, and policies of the Sonoma County General Plan regarding public health and safety.

3.12.3 CEQA Thresholds of Significance Criteria

The evaluation criteria for Public Health and Safety are based on standards promulgated by the EPA and the State of California, and on goals, objectives, and/or policies of regional and local governments and special districts (Table 3.12-2).

The impact criteria are based on guidance provided by CEQA regarding what constitutes a significant environmental effect (CEQA Guidelines, §15065, §15126, and Appendix G). For this EIR, NSCARP is considered to have a significant impact related to public health and safety if it would:

1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

2. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

3. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

4. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code 65962.5 and, as a result, would create a significant hazard to the public or the environment;

5. Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or private use airport, and would result in a safety hazard for people residing or working in the project area;

6. Be located within the vicinity of a private airstrip and would result in a safety hazard for people residing or working in the project area;

7. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;

8. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands; or

9. Cause a public health impact.

3.12.4 Alternatives Analysis

Public Health and Safety impacts resulting from construction and operation of NSCARP are discussed below. The impacts are considered for all project components, including short-term construction and long-term operation, of NSCARP.

Alternative 1 – No Project

The "No Action" Alternative means that SCWA would not implement a regional water conveyance and storage project to serve recycled water to the NSCARP area. As no project, construction, or operational activities would occur, there would be no impacts related to public health and safety.

Alternative 2 – Entire NSCARP

Impact PUB-1: NSCARP may potentially expose workers or the public to contaminated soils during excavation activities, causing an increase in the risk of exposure.

Discussion: Construction of pipelines may be affected by nearby releases of hazardous materials/wastes. Construction could be affected both by hazardous waste sites, and potentially by soil contamination associated with major transportation corridors (highways and railroad ROW). The pipeline-related construction activities that may potentially be impacted by releases of hazardous materials include clearing and grubbing, trench excavations, installation or realignment of underground utilities, and boring and jacking operations, and horizontal directional drilling. These activities would require soil excavation and possibly dewatering, which may expose or otherwise encounter hazardous materials/wastes. Specific project impacts resulting from encountering hazardous materials/wastes during pipeline construction include potential exposure of workers or the public to toxic chemicals in the environment, further contamination of environmental resources, and project schedule delays and budgetary impacts as a result of characterization, removal, and/or disposal of hazardous materials/wastes encountered.

Sites that are suitable for reservoirs are generally located in undeveloped areas that have a low occurrence of hazardous waste sites compared to developed areas.

Construction of the pump stations may be affected by nearby releases of hazardous materials/wastes. The pump station construction activities would be similar to that involving pipeline construction. Impacts to environmental resources could occur through the influence of dewatering systems on local contaminated plumes and the excavation of soil that would provide a low-pressure zone that may attract migrating vapor-phase contaminants. The potential pathways of exposure to workers during the construction phase include dermal contact with contaminated soil and/or groundwater and inhalation of vapors migrating through the soil and into trenches.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criteria: 1 and 2

Mitigation PUB-1: Prior to construction, the SCWA shall develop, and subsequently implement during construction, a Construction Management Program (CMP). Potential hazardous waste release sites would be identified prior to construction by performing an Initial Site Assessment as part of the CMP to identify hazardous waste release sites within 500 feet of pipeline and pump stations construction, as well as reservoir facilities. Identification and proper management of any contaminated groundwater encountered during construction would mitigate impacts to a less than significant level.

The following measures may be included as part of the CMP:

- In the vicinity of hazardous materials/waste release sites, construction activities related to the project that require excavation or exposure of soil or groundwater shall be monitored by the contractor for subsurface contamination. The SCWA shall notify responsible agencies if any hazardous materials/wastes are encountered. Monitoring shall include, at minimum, visual observation by personnel with appropriate hazardous materials training, including 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training;

- In the vicinity of hazardous materials/waste release sites, groundwater brought to the surface as a result of construction dewatering shall be handled in a manner appropriate to the construction-related permits for dewatering. If contamination is suspected or noted during the construction phase, then the groundwater shall be containerized and analyzed for contamination by a laboratory, certified by the CalEPA Environmental Laboratory Accreditation Program (ELAP), using USEPA-approved analytical methods. Where contaminated groundwater is encountered, precautions shall be taken to assure that the installation of piping or other construction activities do not further disperse contamination; and,

- All potentially contaminated materials encountered during project construction activities shall be evaluated in the context of applicable local, state, and federal regulations and/or guidelines governing hazardous waste. All materials deemed to be hazardous shall be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines. Disposal sites for both remediated and non-remediated soils shall be identified prior to beginning construction. Management of these sites shall be documented in a Material Management Plan acceptable to applicable agencies. All evaluation, remediation, treatment and/or disposal of hazardous waste shall be supervised and documented by qualified hazardous waste personnel.

Impact after Mitigation: Less than Significant. With implementation of the above-referenced measure, residual impacts would be less than significant.

Impact PUB-2: NSCARP could result in an accidental upset of hazardous materials used during construction that increases the risk of exposure to the environment, workers, and the public.

Discussion: Construction activities require the use of hazardous materials, such as fuels, oils, solvents, and glues. Exposure or inadvertent release of large quantities (i.e., 25 gallons or more) of these materials into the environment could expose construction workers, the public, and/or the environment to potentially hazardous conditions, or adversely impact soil, surface waters, or groundwater quality.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 2

Mitigation Measure PUB-2:

A. Consistent with the SWPPP requirements identified in Section 3.8 Hydrology and Water Quality, SCWA shall require the contractor to implement Best Management Practices (BMPs) for handling hazardous materials onsite. The use of construction BMPs will minimize adverse effects on groundwater and soils, and will include, without limitation, the following:

   - Follow manufacturers' recommendations and regulatory requirements for use, storage, and disposal of chemical products and hazardous materials used in construction;
   - Avoid overtopping construction equipment fuel gas tanks;
   - During routine maintenance of construction equipment, properly contain and remove grease and oils; and
   - Properly dispose of discarded containers of fuels and other chemicals.

B. SCWA shall follow the provisions of California Code of Regulations, Title 8, Sections 5163 through 5167 for General Industry Safety Orders to protect the project area from being contaminated by the accidental release of any hazardous materials and/or wastes. Disposal of all hazardous materials will be in compliance with applicable California hazardous waste disposal laws. SCWA will contact the local fire agency and the County Department of Public Health, Environmental Health Division, for any site-specific requirements regarding hazardous materials or hazardous waste containment or handling.

C. In the event of an accidental release of hazardous materials during construction, containment and clean up shall occur in accordance with applicable regulatory requirements.

D. Oil and other solvents used during maintenance of construction equipment shall be recycled or disposed of in accordance with applicable regulatory requirements. All hazardous materials shall be transported, handled, and disposed of in accordance with applicable regulatory requirements.

E. If hazardous materials are encountered during construction activities, the contractor will be required to halt construction immediately and notify the SCWA Construction Compliance Section. Disposal of all hazardous materials will be in compliance with all applicable California hazardous waste disposal laws.

F. Prepare and implement a Safety Program to ensure the health and safety of construction workers and the public during project construction. The Safety Program will include an injury and illness prevention program, a site-specific Safety Plan, and information on the appropriate personal protective equipment to be used during construction.

Impact after Mitigation: Less than Significant. With implementation of the above-referenced measure, residual impacts would be less than significant.

Impact PUB-3: Operation of NSCARP facilities would require the use of hazardous materials and may increase the risk of exposure to hazardous materials.

Discussion: Operation of the reservoirs would require the use of Aquashade dye for algae control. The booster pump stations and distribution pump stations would require the use of petroleum products to fuel the pumps. Exposure or inadvertent release of large quantities (i.e., 25 gallons or more) of petroleum products into the environment could expose employees, the public, and/or the environment to potentially hazardous conditions, or adversely impact soil, surface waters, or groundwater quality.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 1

Mitigation Measure PUB-3: Implement Mitigation Measure PUB-2(B)

Impact After Mitigation: Less than Significant. With implementation of the above-referenced measure, residual impacts would be less than significant.

Impact PUB-4: NSCARP may expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations.

Discussion: NSCARP components would be constructed in areas that are generally not accessible to the public. However; construction of pipelines would create excavations within public rights-of way. These excavations would be protected from the public at all times and constructed in accordance with State regulations regarding construction safety. There are no proposed excavations that would be unsafe if safety regulations are followed. No new water bodies, other than the project reservoirs, would be created because of pipeline construction or operation. General construction safety practices, such as site fencing, barricades, and/or signage would protect the public from these hazards during construction activities.

Construction of all facilities would utilize heavy machinery, vehicles, and equipment. Some pump stations would be constructed adjacent to transmission pipelines in areas that are generally accessible to the public. Although heavy equipment would be used to construct the pumping stations, general construction safety practices, such as site fencing and/or barricades, would protect the public from these hazards during construction activities. There is no proposed construction equipment or techniques that would be unsafe if safety regulations are followed. Thus, construction activities would have a less than significant impact on public safety.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 7

Mitigation Measures: None required

Impact PUB-5: Construction activities in grassland areas would have the potential to expose people or equipment to risk or loss, injury, or death involving wildland fires.

Discussion: Potential agricultural irrigation areas in the less-developed hills surrounding agricultural reuse areas in the Russian River and Alexander Valley are within wildland areas that may contain substantial forest fire risks and hazards (CDF 2000, Sonoma County 1989). These areas are subject to the requirements of §4421 et seq. of the Public Resources Code that are intended to prevent fires in wildland areas. The impact would be temporary during the construction phase. Construction activities might bring ignition sources (e.g., the exhaust pipe of vehicles that can ignite dry grasses) into high fire hazard areas.

Impact Category: Significant but Mitigable

Threshold of Significance Criterion: 7

Mitigation PUB-5:

A. Prior to construction, the SCWA shall work closely with local fire agencies to develop a fire safety plan that describes various potential scenarios and actions to be implemented in the event of a fire;

B. During construction, all staging areas, welding areas, or areas slated for construction using spark-producing equipment shall be cleared of dried vegetation or other material that could ignite. Any construction equipment that includes a spark arrestor shall be equipped with a spark arrestor in good working condition. During the construction of the project, SCWA shall require all work vehicles and construction crews to have access to functional fire extinguishers at all times.

Impact after Mitigation: Less than Significant. With implementation of the above-referenced measure, residual impacts would be less than significant.

Impact PUB-6: NSCARP could potentially cause an increase in the exposure of the public to disease vectors (i.e., mosquitoes).

Discussion: Ponding could occur when irrigation rates exceed crop uptake, evapotranspiration, and percolation. Surface water that persists for more than four days provides potential habitat for mosquito larvae. Measure PUB-6 - Mosquito Prevention Program requires that irrigation sites prevent water ponding greater than one inch deep for more than four days and would minimize the potential for creation of mosquito habitat.

Neither construction nor operation and maintenance of the pipelines would create an open body of water where mosquitoes could breed. Any ponding created from a pipeline rupture would be temporary with implementation of Mitigation Measure PUB-6 and would not exist long enough to support mosquitoes or other disease vectors.

Construction of storage reservoirs would create potential habitat for mosquitoes. Shallow reservoirs with a large surface area-to-volume ratios are more likely to create mosquito habitat than deeper reservoirs. Reservoirs with irregular shorelines would also be more likely to create mosquito habitat. Reservoir facilities would generally be filled during the winter and early spring and emptied during the summer as water is withdrawn for irrigation. Thus, potential mosquito habitat could be created by the reservoir component any time water is present.

The NSCARP would be required to comply with the requirements of the Marin/Sonoma Mosquito Abatement District and the Vector Biology and Control Branch of the DHS. Implementation of these requirements would suppress mosquito populations below the threshold level required for disease transmission or nuisance tolerance level. Indirect discharge from sources such as spillways could potentially create breeding habitat for mosquitoes, Mitigation Measure PUB-6, and the requirements listed therein, would suppress mosquito populations below the threshold level required for disease transmission or nuisance tolerance levels. Thus, this impact would be less than significant.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 9

Mitigation PUB-6: The SCWA shall, where feasible, design NSCARP facilities in a manner that minimizes favorable conditions for the development of potential mosquito habitat as described in the DHS and the Marin/Sonoma Mosquito Abatement District's Criteria for Mosquito Prevention in Wastewater Reclamation or Disposal Projects. The criteria identify three general principles of mosquito control: (1) the manipulation of the physical features of the impoundment, (2) biological control, and (3) chemical control. Specific measures could potentially include:

- Water bodies shall have an access ramp constructed on an inside slope for launching a small boat to conduct midge sampling and control;
- A maintenance program for weeds and erosion control on the inner slopes of the water body;
- Biological controls shall be used, such as stocking the reservoir with mosquito fish (*Gambusia affinis*); and,

- Irrigation sites shall not have water ponding deeper than one inch for a period greater than four days during the breeding season.

Impact after Mitigation: Less than Significant. With the incorporation of the above-referenced measure, residual impacts would be less than significant.

Impact PUB-7: NSCARP would result in the use of recycled water for agricultural irrigation. The recycled water applied to the irrigated lands could possibly affect public health.

Discussion: The Porter-Cologne Water Quality Control Act designates the SWRCB responsible for formulating and adopting State policy for water reclamation, while the DHS is responsible for establishing uniform Statewide reclamation criteria to ensure that the use of recycled water would not be detrimental to public health. Under Title 22, water quality criteria set forth by DHS; the recycled water generated by the SCWA qualifies for the highest allowable uses, including agricultural irrigation of food crops, landscape irrigation with high public contract, and non-restricted recreational impoundments. To be used as a source supply for these designations, the recycled effluent would, at all times, be adequately oxidized, coagulated, clarified, filtered, and disinfected effluent. This process requirement constitutes the most stringent treatment practicable. To be considered adequately disinfected, the median number of coliform organisms in the effluent may not exceed a most probable number (MPN) of 2.2 per 100 milliliters over a seven day period and turbidity would be required to be below 2 NTU.

The Santa Rosa, ALWSZ, and Windsor facilities all currently treat recycled water to tertiary levels in compliance with the Title 22 requirements for disinfected recycled water.

The DHS has also produced Guidelines for Use of Recycled Water, which apply to recycled water use areas receiving water that meets Title 22 Water Recycling Criteria. The guidelines focus on application and management specifications for various recycled water uses, including general use requirements, landscape irrigation requirements, impoundment requirements, and agricultural reuse area guidelines. General requirements include posting signs to inform the public in areas where recycled water is in use, confining recycled water to authorized use areas, using purple recycled water distribution and transmission system piping to indicate that it contains recycled water, and other requirements designed to ensure that recycled water use does not adversely effect public health. Specific requirements established by Title 22 that are applicable to NSCARP are contained in Article 4, Section 60310 – Use Area Requirements, which restricts irrigation of disinfected tertiary-treated water within 50 feet of any domestic water supply well unless specific technical analyses are conducted.

If fully implemented, NSCARP would result in the irrigation of approximately 21,000 acres of land with recycled water. Irrigation with recycled water could contribute to loading of specific constituents to groundwater supplies in the vicinity of irrigation sites. Water quality and public health concerns regarding the use of recycled water include metals, microorganisms, total dissolved solids (TDS), and nitrates. Metals would not be expected to adversely affect groundwater quality because all metals in the recycled effluent would be below their respective maximum contaminant levels (MCLs) according to the drinking water standards in Title 22. In addition, metals are removed from water in soils through a complex process of adsorption, precipitation, ion exchange, and complexation. Microorganisms, including bacteria and viruses, are removed from water through filtration, adsorption, desiccation, predation, and exposure to other adverse conditions. Bacteria, including coliform, are removed by filtration through the soil. In general, there is greater filtration of bacteria in fine-grained material than in course-grained material. Studies of wastewater application indicated that coliform bacteria are normally removed after five feet of percolation through the soil (ESA, 2000).

Potential health impacts from use of recycled water were evaluated in a human health risk assessment that was prepared for the Long-term Project (Parsons Engineering Science, 1996). Updated information was used to prepare the Human Health Risk Assessment used for the Incremental IRWP EIR (Parsons, 2003).

For the IRWP, additional water quality data were collected. The updated Health Risk Assessment concluded irrigation of agricultural land with recycled would not present a health risk.

The over-application of recycled water would have the potential to affect surface water quality if this resulted in surface ponding or direct runoff to local creeks or other water bodies.

As discussed in Section 3.8 Hydrology/Water Quality, recycled water stored in the reservoirs could infiltrate into the groundwater and result in a degradation of groundwater quality and alteration in groundwater flows. However, the reservoirs would be compacted at the bottom and lined using a clay liner. The clay lining would have a low permeability allowing for only minor infiltration of stored water to maximize the efficiency of the reservoir and prevent degradation of ground water.

I**mpact Category:** Significant but Mitigable

CEQA Threshold of Significance Criterion: 9

Mitigation Measure PUB-7:

A. The SCWA shall require that a Recycled Water User Agreement (RWUA), an agreement between SCWA and each water user, be developed prior to the water user receiving recycled water. The RWUA shall include provisions that require recycled water to be applied compatible with good farming practices on land, consistent with runoff, ponding, and environmental restrictions (complying with Title 22 requirements) such as prohibit the over-application of recycled water (and subsequent ponding or surface runoff). Continued implementation of these measures would ensure that Title 22 requirements are met, that surface waters are protected, and that potential impacts to groundwater levels and water quality would be minimized, thus, ensuring no impact to public health. The SCWA shall be responsible for periodic monitoring of each NSCARP water user's practices to ensure that their ongoing use of the recycled water is consistent with Title 22 requirements and the RWUA.

B. Implement Mitigation Measure HWQ-4.

Impact After Mitigation: Less than Significant. With the incorporation of the above-referenced measure, residual impacts would be less than significant.

Impact PUB-8: NSCARP would result in the storage of recycled water, which could possibly affect public health.

Discussion: Based on the results of the Health Risk Assessment update, storage of recycled water in reservoirs is not expected to affect public health. The stored water would meet Title 22 requirements for recycled water, which are designed to protect public health. Furthermore, the reservoirs would be lined with impermeable clay to minimize any seepage of recycled water (see **Impact PUB-7** and **Impact HWQ-4**). In addition, specific requirements established by Title 22 that are applicable to NSCARP are contained in Article 4, Section 60310 – Use Area Requirements, which restricts irrigation of disinfected tertiary treated water within 50 feet of any domestic water supply well unless specific technical analyses are conducted. Section 60130 of Title 22 also restricts impoundments of disinfected tertiary treated water within 100 feet of any domestic water supply well.

I**mpact Category:** No Impact

CEQA Threshold of Significance Criterion: 9

Mitigation Measures: None required

Impact PUB-9: NSCARP could potentially result in release of recycled water from pipelines that could possible affect public health.

Discussion: Under normal operating conditions, neither construction nor operation of the pipelines would release recycled water to the environment. Therefore, there would be no exposure to the public. Temporary exposure of the public to runoff from a pipe rupture could occur for a very brief time period. The quantity of water released (about 15,000 gallons) would be limited from transmission piping by the closure of isolation valves on both sides within two minutes of a detected pressure drop. After valve closure, recycled water remaining in the pipeline may be released depending upon the slope and depth of the pipeline at the point of break, but this release would not be under pressure because the valves would be closed. Because these impacts would be of limited duration and quantity (much less than potential exposures due to agricultural irrigation) such impacts would be less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 9

Mitigation Measures: None required

Impact PUB-10: NSCARP recycled water may contain unregulated compounds, such as EDCs, which could affect public health.

Discussion: In recent years there has been heightened scientific awareness and public debate over potential impacts that may result from exposure to EDCs. A recent state-of-the-science assessment by World Health Organization (WHO) defines an EDC as a substance or mixture that alters function of the endocrine system and consequently causes adverse health effects in an intact organism or its progeny (World Health Organization, 2002). Endocrine disruption may be described as a functional change that may lead to adverse effects, not necessarily a toxicological end-point. Most EDCs are human-made synthetic chemicals (such as hormones or other drugs) released into the environment unintentionally (e.g., as a trace element in human urine). EDCs may block, mimic, stimulate, or inhibit the production of natural hormones, disrupting the endocrine system's natural functions. The endocrine system is a combination of glands and hormones that assist in vertebrate reproduction, growth, and development.

Certain drugs, such as birth control pills, intentionally alter the endocrine system. Although there are some known EDCs, many chemicals are termed "suspect," because there are not enough data to make a conclusive determination of their endocrine disrupting characteristics. Plants, such as soybeans and garlic, produce natural EDCs as a defense mechanism. The U.S. Geological Survey (Barnes et al. 2002) found occurrence of EDCs or potential EDCs to be high in surface waters across the country. The study found 80 percent of the streams sampled contained at least one of the 95 listed constituents that were tested. Although occurrence frequency was relatively high, measured concentrations were low, usually below drinking water standards for compounds having such standards.

The potential ecological effects of EDCs in the aquatic environment were first reported in the 1990s, including studies that suggested that the presence of natural and synthetic estrogen hormones in wastewater induced vitellogenin production in male fish, which is a protein involved in reproduction and normally only found in females (Desbrow et al., 1998). Similar results were observed with alkylphenolic compounds that are breakdown products of industrial surfactants used in products such as paints, herbicides, and cosmetics (Jobling et al., 1996). Other research has since confirmed that natural and synthetic estrogens are present in effluents in sufficient quantity that they could potentially cause endocrine disruption in some fish (Rodgers-Gray et al., 2000).

Adverse effects have been observed in humans when exposed to endocrine disruptors. However, cases have only been documented in instances of gross exposure, and not at the levels measured in ambient waters. Human exposure and dose response to EDCs in concentrations at the low levels found in the environment is still unknown. The absence of adequate exposure data, especially exposure data during critical development periods, is the weakest link in determining whether any observed adverse effects in humans and/or fish and wildlife are linked to EDCs. The WHO's state-of-the-science assessment concludes that "…our current understanding of the effects posed by EDCs to wildlife [including fish] and humans is incomplete."

The National Toxicology Program (NTP) draft report of the Endocrine Disruptors Low-Dose Peer Review was released for public comment in May 2001 (Federal Register Vol. 66, No. 95, May 16, 2001). As stated in the NTP's Report, "the focus of this review was on 'biological change' rather than on 'adverse effect' because, in many cases, the long-term health consequences of altered endocrine function during development have not been fully characterized". Results of the NTP report found that endocrine disrupting effects were demonstrated when laboratory animals were exposed to low-dose endocrine active agents. Additional recommendations were made regarding research approaches and needed future studies.

Some known EDCs (e.g., PCBs, DDT, chlordane) are regulated via ambient water quality criteria or drinking water standards based on their toxicological and carcinogenic effects. However, there are no applicable water quality criteria for natural and synthetic estrogens or related pharmaceutical chemicals. Based on the current state of knowledge regarding dose response relationships of EDCs for various organisms at the low levels in which they can occur in surface waters, it is likely to be a number of years, possibly many years, before any such standards are promulgated. The approach in the United States has been that more definitive information needs to be gathered and conclusive research conducted before regulatory measures can be taken. In the most recent version of Title 22, Chapter 3 Recycling Criteria (Section 60320.040 (g) (2), Draft August, 2002), DHS has included monitoring requirements for EDCs and pharmaceuticals in recycled water for purposes of groundwater recharge only.

A number of factors suggest that the effects of NSCARP would be minimal with regards to exposing persons to these compounds. There would be no change in the volume of treated water, but a change in he location of the storage. Rather than being stored at the City of Santa Rosa, ALWSZ, and Windsor facilities, the water would be stored at smaller reservoirs within the NSCARP area. Measures are proposed to minimize impacts to surface water and groundwater quality. Also, recycled water applied to the agricultural fields will evaporate, percolate into soil, or be taken up by the plants. This sequestration would limit exposure to person from direct discharge into open water. Furthermore, exposure of the recycled water to soil may increase biodegradation and/o adsorption of EDCs and xenobiotics to organic matter, thereby reducing concentrations and availability to humans.

However, the requirements do not identify the specific contaminants to be monitored. Because there are no current regulatory criteria with which to evaluate effluent concentrations of EDCs, permit compliance is not used as a basis of this impact analysis. Based on the above discussion, the concentrations of EDCs that may be present in the NSCARP recycled water are not likely to be causing large-scale adverse effects to public health. This issue is the subject of ongoing research. The SCWA will monitor ongoing research and will consult with the NCRWQCB on further permitting actions, if needed.

Impact Category: In accordance with Section 15145 of the State CEQA Guidelines, the impact of EDCs on public health from operation of NSCARP is too speculative to be reasonably concluded because of the following reasons: (1) no evidence of systemic effect on public health; (2) low concentrations of suspected EDCs for which testing is performed (e.g., lindane, endosulfan, and lead); (3) lack of regulatory criteria with which to evaluate effluent concentrations of EDS on public health; and, (4) research on the subject is on-going and the subject is not well understood at this point in time. As such, no impact conclusion can be made based on the current state-of-the-science on the issue.

CEQA Threshold of Significance Criterion: N/A

Mitigation Measure PUB-10: Because of the evolving research on the issue of EDCs and xenobiotics, SCWA will perform the following:

- Monitor on-going research to stay abreast of the state-of-the-science concerning EDCs and Xenobiotics;
- Consult and coordinate with the RWQCB, USEPA, and other regulatory agencies on developing standards and promulgating regulations;
- Implement appropriate treatment technologies, as required by regulatory agencies; and,
- Formulate and implement adaptive management procedures to respond to changes in regulations.

Alternative 3 - Alexander Valley-Jordan Reservoir Subset

This alternative represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C Reservoirs. Also, there would only be a total of 88,176 lineal feet of pipeline constructed; only one creek/river crossing (Russian River); no booster or distribution pump stations; and only irrigation of 3,492 acres. Potentially significant impacts would be similar to Alternative 2. As such, impacts related to public health and safety could still potentially occur, but would impact a smaller geographic area; therefore, mitigation measures being applied to Alternative 2 would be implemented for Alternative 3 to lessen impacts to public health and safety to a less than significant level.

Alternative 4 - Russian River-Westside Subset

This alternative represents a scaled-down version of the Russian River Valley subarea by limiting storage reservoir development to Russell, Russell-Bucher, Becnel and Gallo Twin Valley Reservoirs. Also, there would only be a total of 58,608 lineal feet of pipeline constructed; only one creek/river crossing (Russian River); only one booster pump station and two distribution pump stations; and only irrigation of 2,115 acres. Potentially significant impacts would be similar to Alternative 2. As such, impacts related to public health and safety could still potentially occur, but would impact a smaller geographic area; therefore, mitigation measures being applied to Alternative 2 would be implemented for Alternative 4 to lessen impacts to public health and safety to a less than significant level.

3.13 RECREATION

3.13.1 Physical Setting

Within Sonoma County, there are a number of agencies that provide a variety of recreational opportunities for residents and visitors. These include: California State Park at Sonoma Coast State Beach and Sonoma Historic State Park; the Lake Sonoma Recreation Area administered by the Corps; the Sonoma County Regional Park System; the park and recreation departments of five cities (Santa Rosa, Healdsburg, Petaluma, Sonoma, and Sebastopol); and three special park districts. In addition, there are parks and recreation facilities within the County that are operated by private non-profit organizations.

Outdoor recreation within Sonoma County includes activities associated with the use of parks, waterways, equestrian and hiking trails, and bicycle routes. Sonoma County open space provides a diverse array of recreational opportunities including fishing, camping, swimming, picnicking, and trails for horseback riding, hiking or bicycling for County residents and visitors.

The County General Plan Open Space Element designates outdoor recreation areas within the County. Because the Russian River is a navigable waterway from Cloverdale to the coast, public access is protected by Article XV, Section 2 of the California Constitution. The Open Space Element identifies a proposed waterway trail extension from the coast to Preston Bridge immediately north of Cloverdale; however, an existing segment of the Russian River Waterway Trail, a County-designated trail, is located within the boundaries of the proposed project and traverses an approximately nine-mile span of the Alexander Valley portion of the NSCARP. The NSCARP does not include development of the northern segment of the proposed waterway trail extension nor would it require modification of the existing segment of the Russian River Waterway Trail.

The Russian River provides a variety of recreation opportunities throughout much of the year. The Russian River offers a wide range of water-related recreational activities, including various shoreline uses as well as camping, swimming, fishing, and boating.

No County Regional Parks are located within the NSCARP area; however, nearest parks are the Riverfront Regional Park, which is located approximately one-half mile south of the project's terminus on Eastside Road, and Healdsburg Veterans Memorial Beach located at 13839 Old Redwood Highway in Healdsburg, approximately 1.2 miles north of the Russian River Valley portion of the NSCARP.

Bicycle touring routes in Sonoma County that are within the NSCARP boundaries include Highway 128, Old Redwood Highway, Dry Creek Road, and Dutcher Creek Road. The Sonoma County Transportation Authority Countywide Bicycle Plan 2003 Update identifies planned bicycle facilities throughout the county. As shown in Table 3.13-1, one Class II bicycle lane currently exists within the project area. Likewise, several Class II bicycle lanes and Class III bicycle routes are planned within the NSCARP area.

Tables 3.13-1. Existing and Planned Bicycle Facilities Within the NSCARP Area

Roadway	Bicycle Facility[1]
Geysers Road	Planned Class III
River Road (Northern Alexander Valley)	Planned Class III
Asti Road	Planned Class II
Dutcher Creek Road	Existing State bicycle touring route
Geyserville Avenue	Planned Class II
Dry Creek Road	Planned Class II and Existing State bicycle touring route
Canyon Road	Planned Class III
State Route 128	Planned Class III and Existing State bicycle touring route
Alexander Valley Road	Planned Class III
Westside Road	Planned Class III
Old Redwood Highway	Existing Class II and Existing State bicycle touring route
Eastside Road	Planned Class III
Wohler Road	Planned Class III
Slusser Road	Planned Class III
River Road (Denner Ranch area)	Planned Class II

Source: SCTA Countywide Bicycle Plan 2003 Update, 2003

1 Note that roadways are listed north to south relative to their location within the project area.

3.13.2 Regulatory Setting

Local

The purpose of the Sonoma County General Plan, Open Space Element is to preserve the natural and scenic resources which contribute to the general welfare and quality of life for the residents of the County and to the maintenance of its tourism industry. The Open Space Element provides a policy framework for the preservation of open space and identifies four classifications of open space: scenic resources (see Section 3.1 of this Draft EIR/EIS), biological resources (see Section 3.4 of this Draft EIR/EIS), archaeological/historical resources (see Section 3.5 of this Draft EIR/EIS), and outdoor recreation. Table 3.9-3 identifies two recreational policies of the General Plan that have been identified through this assessment of having potential applicability to the NSCARP. Table 3.9-3 also provides a summary assessment of the NSCARP's consistency with each of the policies identified.

3.13.3 Methodology

This section provides information regarding potential recreation impacts resulting from implementation of the NSCARP. The impact analysis considered adopted General Plan policies, goals, and applicable regulations, as well as existing parks, open space, and recreation facilities within the NSCARP area.

3.14.3 CEQA Thresholds of Significance Criteria

The evaluation criteria for Recreation impacts are presented in Table 3.13-2. These criteria are drawn from CEQA requirements and supplemented with applicable goals, objectives and policies from the Sonoma County General Plan Open Space Element. Recreation impacts would be considered significant if the project increased demand for park and recreation facilities, required the construction of new recreational facilities, or contributed to the deterioration of existing facilities.

Table 3.13-2. CEQA Evaluation Criteria/Thresholds of Significance

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will the NSCARP increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	Additional recreational demand.	Any additional demand beyond existing or planned capacity.	CEQA Guidelines Appendix G, Checklist Item XIV(a) Sonoma County General Plan Open Space Element.
2. Does the NSCARP include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	Physical impacts associated with the construction of additional recreational facilities.	Significance threshold would be associated with the aspect(s) of the physical environment that would be affected.	CEQA Guidelines Appendix G, Checklist Item XIV(b) Sonoma County General Plan Open Space Element.

3.13.3 Alternatives Analysis

Alternative 1 – No Project/Action

Under the No Project Alternative, NSCARP would not be built. As such, potential recreational impacts associated with temporary roadway, sidewalk, bicycle lane, and recreational trail closures (see discussion of impacts associated with other alternatives, below) would not occur under the No Project Alternative. Implementation of the No Project Alternative would result in a continuation of existing irrigation practices and no impacts to existing or planned recreational facilities would result. Because the No Project Alternative would result in no change to existing conditions, this impact is considered less-than-significant.

Alternative 2 – Entire NSCARP

Impact REC-1: NSCARP could result in increased use of or deterioration of existing recreation facilities.

Discussion: The NSCARP and its associated components (i.e., storage reservoirs, pumping stations, and pipelines) would not result in the physical deterioration of existing recreational facilities nor would it create additional demand for recreational facilities.

Construction-related activities within and adjacent to the roadway right-of-way would have the potential to obstruct bicycle routes and pedestrian walkways, potentially restricting recreational opportunities within the project area. Upon completion of construction activities, affected project area roadways, sidewalks, and recreational trails would be restored to existing conditions or better. Development and compliance with the Traffic Control Plan (as discussed in Chapter 2) would reduce potential recreational impacts to less than significant.

The purpose of NSCARP is to provide recycled water for irrigation of agriculture in compliance with federal and state regulations, including DHS requirements listed under Title 22. Provision of this recycled water would offset use of surface water supplies, which would increase summer flows in the tributaries of the Russian River. In addition, reduced agricultural diversions from the Russian River would help maintain storage levels in Lake Mendocino, resulting in more water being available that can be released in the fall to assist with Chinook salmon upstream migration. As such, NSCARP may benefit recreational opportunities by increasing the amount of water that can be released in the fall into the Russian River.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 1

Mitigation Measures: None required

Impact REC-2: NSCARP could result in temporary access restrictions at existing recreation facilities.

Discussion: Although several bicycle facilities are planned for future development within the area, the NSCARP does not include the development of bicycle facilities and would not affect their planned development.

Construction of NSCARP and its associated components (i.e., storage reservoirs, pumping stations, and pipeline) would have the potential to result in temporary access restrictions to state bicycle touring routes and sidewalks within the project area. Construction-related activities within and adjacent to the roadway right-of-way would have the potential to obstruct bicycle routes and pedestrian walkways, potentially restricting recreational opportunities within the project area. Construction activities would require lane closures along roadways; however, road closures would be kept to a minimum and appropriate detours would be provided. As discussed in Chapter 2, a Traffic Control Plan would be prepared for NSCARP. The Traffic Control Plan would include advance public notification of temporary sidewalk, bicycle lane, and recreational trail closures and would identify alternate routes during such closures. Development and compliance with the Traffic Control Plan would reduce potential recreational impacts to less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 2

Mitigation Measure: None required

Alternative 3 – Alexander Valley-Jordan Reservoir Subset

The study area for Alternative 3 is located in the same region as Alternative 2, but is smaller in scale. Alternative 3 would result in similar recreation impacts as under Alternative 2 from construction of recycled water pipelines, storage reservoirs, and distribution and booster pump stations, but these impacts would occur at fewer locations than under Alternative 2. Construction activities would have the potential to temporarily disrupt bicycle routes, sidewalks, and recreational trails; however, like Alternative 2, the Traffic Control Plan would include advance public notification of temporary sidewalk, bicycle lane, and recreational trail closures and would identify alternate routes during such closures.

Alternative 4 – Russian River Valley-Westside Subset

The study area for Alternative 4 is located in the same region as Alternative 2, but is smaller in scale. Alternative 4 would result in similar recreation impacts as under Alternative 2 from construction of recycled water pipelines, storage reservoirs, and distribution and booster pump stations, but these impacts would occur at fewer locations than under Alternative 2. Construction activities would have the potential to temporarily disrupt bicycle routes, sidewalks, and recreational trails; however, like Alternative 2, the Traffic Control Plan would include advance public notification of temporary sidewalk, bicycle lane, and recreational trail closures and would identify alternate routes during such closures.

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3.14 TRANSPORTATION/TRAFFIC

This section provides information regarding potential traffic and circulation impacts, including roadway congestion, traffic delays, restricted access, increased traffic hazards, and damage to roadbeds. In order to provide a basis for the evaluation of construction impacts on transportation, the setting section describes the existing roadway network and other modes of transportation in the NSCARP area.

3.14.1 Physical Setting

Sonoma County is generally considered a rural, low-density region. Because major trip attractors are dispersed throughout the County, the dominant mode of transportation is the private automobile. The NSCARP region itself is also one of the more rural areas of the County. Much of the traffic trips passing through the NSCARP area are regional in nature via U.S. Highway 101 (U.S. 101).

The regional roadway network includes roads ranging from freeways to rural roads. With the exception of U.S. 101, all highways in the region are one or two lane rural roadways. Several of the project area roadways are narrow and winding, and traffic patterns are often affected by recreational travel, especially on summer weekends (Sonoma County General Plan, 1989). Due to the type of agricultural activities in the area, local and rural roads may carry large farm-related trucks and other heavy equipment.

The transportation network within the NSCARP area includes six primary types of roadways, each of which serves a different function in terms of movement and access. They are as follows:

Freeways

Freeways generally carry long distance inter-city and intra-city traffic and are designed to separate two or more travel lanes with a median, to prohibit access from adjacent properties and to limit access from cross streets by providing grade separations. Access to cross streets is provided at a select number of grade-separated interchanges.

U.S. 101 serves regional and countywide travel as the major north-south through route for the North Coast region. It provides regional access to Mendocino County to the north and to Marin County and the San Francisco Bay area to the south. U.S. 101 is a commuter corridor between Sonoma County and the San Francisco Bay area and is heavily traveled during the morning and evening peak time. U.S. 101 runs north-south through the NSCARP area and provides access to various roadways in the Alexander, Dry Creek, and Russian River valleys. Within the northern area of Sonoma County, the average daily traffic on U.S. 101 is approximately 40,000 vehicle trips.

Primary Arterials

Arterials are relatively high speed (30 to 45 miles per hour [mph]) roads that provide access to regional transportation facilities and serve relatively long trips within a community. Although they are principally intended to serve intercity travel, they may also provide routes of regional significance in less heavily traveled corridors and some local traffic in larger urban areas.

Arterials are intended to serve a through-traffic function and not to provide access to property. Arterial streets typically carry in excess of 15,000 vehicle trips on a daily basis. In the vicinity of freeway and highway connections, these daily volumes may be as high as 40,000 vehicle trips. As defined in the Sonoma County General Plan, Circulation and Transit Element (1989), State Route (SR) 128 is the only primary arterial in the NSCARP area.

Secondary Arterials

Secondary arterials in general serve the same function as primary arterials but either carry a lesser volume of traffic or carry a higher proportion of local traffic over shorter distances.

Major Collectors

Major collectors primarily serve internal traffic within a community and carry traffic to the arterial system. In urban areas, collectors may carry traffic volumes in excess of 10,000 vehicles per day, although traffic volumes in rural areas are considerably less. As defined in the Sonoma County General Plan, Circulation and Transit Element (1989), Alexander Valley Road, Geysers Road, and Dry Creek Road are major collectors within the NSCARP area.

Minor Collectors

Minor collectors serve the same function as major collectors, but are located primarily in rural areas where traffic volumes tend to be lower but the length of roadway trips is generally longer. As defined by the Sonoma County General Plan, Circulation and Transit Element (1989), Westside Road is the only minor collector within the NSCARP area.

Local Streets

Local streets are low speed (25 mph or less), low volume roadways that provide direct access to adjacent land uses. Driveways to individual parcels, on-street parking, and pedestrian access are allowed. Local streets can carry as few as 100 daily trips and up to several thousand daily trips depending on the length and adjacent land use.

Rural Roads

Rural roads carry traffic to outlying areas serving agricultural, residential, and recreational land uses. While these roadways are primarily for land access, some may carry a number of longer distance trips due to the sparse roadway network in some rural areas. Because of the variety of uses they serve, the traffic on rural roadways may include automobiles, trucks, buses (public transit, tourist, or school), recreational vehicles, and farm equipment. In addition, these streets provide critical access for emergency vehicles in remote areas. Rural streets often have narrow cross-sections with no paved shoulders. Most rural roads carry less than a thousand daily trips and many carry fewer than one hundred daily trips.

Project Area Roads

Proposed recycled water pipeline would be located within the existing right-of-way along area roadways. Table 3.14-1 identifies the roadways along which recycled water pipelines within the NSCARP boundaries would be placed.

Table 3.14-1. Proposed Pipeline Roadway Right-of-Way Locations

Alexander Valley		Dry Creek Valley	Russian River Valley
State Route 128	Red Winery Road	Dry Creek Road	Westside Road
Alexander Valley Road	Geysers Road	West Dry Creek Road	Wohler Road
Lytton Station Road	Wilson Road	Yoakim Bridge Road	Eastside Road
Hassett Lane	Moody Lane	Lambert Bridge Road	Trenton Road
Fredson Road	River Road	Mill Creek Road	Trenton Healdsburg Road
Geyserville Avenue	Canyon Road	Foreman Lane	Denner Ranch Road
West Soda Rock Lane	Chianti Road	Westside Road	Oakwild Lane
West Sausal Lane	Zanzi Lane		
Ketchum Road	Asti Road		
East Sausal Lane	Dutcher Creek Road		
Pine Flat Road	Washington School Road		

Source: SCWA, 2005

Existing Traffic Volumes

The weekday travel patterns within the project area are typical of outlying portions of urban areas. The primary peak periods of travel are between 7:00 to 9:00 A.M. and between 4:00 to 6:00 P.M. There are a significant number of commuters that travel south to Marin County and San Francisco during the morning peak and return during the evening peak. The existing peak periods are a result of the combination of local traffic and long distance commute traffic.

In addition to these weekday peaks, the NSCARP area also has very high weekend traffic volumes due to the recreational and tourist traffic in the area. The weekend traffic tends to peak during mid-day on Saturday when local travel and tourist travel are each at their peak.

Level of Service Concept

Level of service (LOS) is a quantitative measure describing operational conditions for intersections and roadways. The descriptions of individual levels of service characterize these conditions in terms of such factors as travel speed (and thus travel time), freedom to maneuver, traffic interruptions, and comfort and convenience. The six levels of service, A through F, represent driving conditions from best to worst, respectively. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. The characteristics of traffic flow for these various levels of service are summarized in Table 3.14-2.

Table 3.14-2. Level of Service Thresholds

Level of Service	Freeway	Arterial Class I	Arterial Class II	Arterial Class III	Rural-Suburban	Rural Arterial Class A	Rural Arterial Class B	Rural Arterial Class C	Rural Arterial Class D
Range of free flow speed (mph)	--	45 to 35	35 to 30	35 to 25	30 to 45	55 to 45	45 to 35	35 to 30	35 to 25
Typical Free Flow Speed (mph)	65	40	33	27	Varies	50	40	33	27
A	--	≥ 35	≥ 30	≥ 25	≥ 47	≥ 47	≥ 38	≥ 31	≥ 26
B	≥ 50	≥ 28	≥ 24	≥ 19	≥ 43	≥ 43	≥ 34	≥ 28	≥ 23
C	≥ 47	≥ 22	≥ 18	≥ 13	≥ 35	≥ 35	≥ 28	≥ 23	≥ 19
D	≥ 42	≥ 17	≥ 14	≥ 9	≥ 31	≥ 31	≥ 23	≥ 20	≥ 16
E	≥ 30	≥ 13	≥ 10	≥ 7	≥ 23	≥ 23	≥ 18	≥ 15	≥ 12
F	< 30	< 13	< 10	< 7	< 23	< 23	< 18	< 15	< 12

Source: Sonoma County General Plan EIR, 2006

Transit

Sonoma County Transit Route 60 runs through Asti, Geyserville, and Healdsburg within the NSCARP area. Two bus stops are located within the NSCARP boundaries: one at the intersection of Asti Road and Asti Post Office Road within the Northern Alexander Valley area, and one at the intersection of Geyserville Avenue and State Route 128 providing access to Geyserville High School. The Express 22 bus line between Santa Rosa and Sebastopol also runs through the southern end of the Russian River subarea, along River Road (Sonoma County Transit, 2005).

Pedestrian and Bicycle Access

Though project area roadways are flanked by shoulders, pedestrian access is limited as roads are winding and provide limited sight distances.

Bicycle touring routes that are located within the NSCARP boundaries include Highway 128, Old Redwood Highway, Dry Creek Road, and Dutcher Creek Road. According to the Countywide Bicycle Plan 2003 Update, the following NSCARP area roads have been proposed to include Class II (striped lanes for one-way bike travel): Dry Creek Road, Geyserville Avenue, Healdsburg Road, River Road, and Asti Road. In addition, a proposed Class I trail (that provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross-flow of motorized traffic minimized) is proposed between the cities of Healdsburg and

Windsor. This trail would be known as the “Smart Trail” (Countywide Bicycle Plan 2003 Update, 2003).

According to the 2000 Census figures on commute patterns in Sonoma County, approximately 1.7 percent of Sonoma County residents use bicycles as the principle mode of transportation to work.

Every spring RIDES for Bay Area Commuters conducts a telephone survey of commuters in the nine Bay Area counties. The survey is designed to track the commuting patterns of residents. Data are collected only at a county level, not by city. The 2002 RIDES Commuter Profile Survey (shown in Table 3.14-3) indicates that one percent of those surveyed in Sonoma County use bikes as their primary mode of transportation. These results strongly correspond with the 2000 Census data. The results also correspond with the Bay Area averages (Sonoma County Transit Authority, 2003).

Table 3.14-3. Sonoma County Pedestrian/Bike Commuter Profile

Mode of Transportation	1999	2000	2001	2002
Bike	1.5%	1.5%	1%	1%
Walk	1.2%	1.3%	1%	2%

Source: SCTA Countywide Bicycle Plan 2003 Update, 2003

Railroad Transportation

The Northwestern Pacific Railroad (NWPRR) had provided service to Sonoma County since the 1870s. Despite the presence of the physical railway and related facilities, there is no passenger or freight railroad service currently operated on this line. Rail passenger service was discontinued in the mid-1950s; with rail freight service discontinued in the 1990s. The line re-opened briefly in 2001, but then was closed by the Federal Railroad Administration due to a failure to meet safe track standards.

The Northwestern Pacific Railroad alignment parallels U.S. 101 and runs north-south through the NSCARP area. Segments of recycled water pipeline are proposed to be located within the abandoned railroad right-of-way in the Northern Alexander Valley portion of the NSCARP; however, no encroachment permits would be needed.

3.14.2 Regulatory Setting

Federal

The only road in Sonoma County within the Federal Highway System is U.S. 101. Projects involving improvements to U.S. 101 must meet federal highway standards and are subject to the NEPA. Though NSCARP is subject to NEPA, the project does not propose modifications to U.S. 101 and; therefore, is not subject to Federal Highway Administration review and approval.

State

The California Department of Transportation (Caltrans) manages interregional transportation, including management and construction of the California State highway system and is responsible for several highways under the State system in Sonoma County: Highways 1, 12, 37, 116, 121, and 128. Modifications and improvements to these roads must meet Caltrans standards and are subject to CEQA. Funding is also programmed through the regional Metropolitan Transportation Commission and Sonoma County Transportation Authority (SCTA) comprised of representatives of the County and each of the nine cities.

Caltrans' construction practices require temporary traffic control planning "during any time the normal function of a roadway is suspended" (FHWA, 2003). In addition, Caltrans requires that permits be obtained for transportation of oversized loads and transportation of certain materials, and for construction-related traffic disturbance. Caltrans regulations would apply to construction of the pipeline within and immediately adjacent to roadways, as well as the transportation of construction crews and construction equipment throughout the project area (Caltrans, 2004b).

Local

Countywide Transportation Plan

The 2001 Countywide Transportation Plan for Sonoma County provides further guidance for transportation planning and associated goals and policies (SCTA, 2001). This plan is currently being updated and is available in draft form. This plan focuses on the design and implementation of improvements to the county circulation system, including roadways, bikeways, and rail service. Therefore, the plan does not include policies relevant to NSCARP.

Sonoma County General Plan

The purpose of the Sonoma County General Plan, Circulation and Transit Element, is to plan for future travel demand and to attempt to alleviate traffic congestion resulting from growth in employment and population, changes in transportation patterns, and recreational use. The Circulation and Transit Element provides a policy framework for future transportation facilities that will: 1) help accomplish the planned pattern of future land uses, 2) not be growth inducing, 3) serve the needs of all population groups and enable transport of goods and materials, and 4) contribute to environmental quality and achieve environmental goals.

Refer to Section 3.9, Table 3.9.3 for a list of applicable goals, objectives, and policies of the Sonoma County General Plan regarding transportation and traffic.

3.14.3 Methodology

The numbers of construction vehicle trips were estimated based on typical construction practices. Construction traffic volumes were estimated to determine if construction traffic would potentially increase traffic on roadways that would exceed the capacity of the roadway. Project components (i.e., pipelines, pumping stations, and reservoirs) were also evaluated to determine if construction would result in lane closures or access restrictions. Worker parking and construction staging areas are discussed in terms of their potential traffic impacts.

Construction of the NSCARP components would result in short-term increases in vehicle traffic and construction activities; however, operation and maintenance of NSCARP components would not generate any permanent increases in traffic due to component operations.

3.14.4 CEQA Thresholds of Significance Criteria

The evaluation criteria for Transportation/Traffic impacts are presented in Table 3.14-4. These criteria are drawn from CEQA requirements and supplemented with applicable goals, objectives and policies from the Sonoma County General Plan Circulation and Transit Element. Transportation/Traffic impacts would be considered significant if the project resulted in an increase in local traffic, introduced hazards to the project area roadways, resulted in inadequate emergency access, resulted in inadequate parking capacity, or conflict with applicable alternative transportation plans/programs.

Table 3.14-4. CEQA Evaluation Criteria/Thresholds of Significance

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will the NSCARP cause an increase in local traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	a. Increase in traffic along area roads as a result of construction activities. b. Levels of Service (LOS) along affected roadways and at intersections.	Increase in traffic that exceeds roadway load and capacity. Increase in traffic due to operational and maintenance activities resulting in LOS below Sonoma County standards.	CEQA Guidelines Appendix G, Checklist Item XV(a)
2. Will the NSCARP exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	LOS along affected roadways and at intersections.	Increase in traffic due to operational and maintenance activities resulting in LOS below Sonoma County standards.	CEQA Guidelines Appendix G, Checklist Item XV(b)
3. Will the NSCARP substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Number of miles of roadway not restored to existing conditions or better. Number of locations where ingress/egress of construction equipment onto a major roadway is not in accordance with defined safety regulations.	Greater than 0 miles. Greater than 0 locations.	CEQA Guidelines Appendix G, Checklist Item XV(d)

Table 3.14-4. CEQA Evaluation Criteria/Thresholds of Significance (Continued)

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
4. Will the NSCARP result in significant traffic delays resulting in inadequate emergency access?	Miles of temporary lane or roadway closures resulting in significant traffic delays.	Greater than 0 miles.	CEQA Guidelines Appendix G, Checklist Item XV(e)
5. Will the NSCARP result in inadequate parking capacity (esp. during construction activities) or inadequate business/residence access?	Number of vehicles (esp. construction vehicles) unable to be accommodated by on-site parking. Number of business/residence access points inaccessible.	Greater than 0 vehicles. Greater than 0 access points.	CEQA Guidelines Appendix G, Checklist Item XV(f)
6. Will the NSCARP conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	Miles of temporary lane or roadway closures resulting in significant restricted alternative transportation access.	Greater than 0 miles.	CEQA Guidelines Appendix G, Checklist Item XV(g)

3.14.5 Alternatives Analysis

Alternative 1 - No Project

Under the No Project Alternative, the NSCARP would not be built. As such, the adverse impacts associated with temporary construction activities would not occur under the No Project Alternative. Implementation of the No Project Alternative would result in a continuation of existing irrigation practices and no anticipated changes to traffic and circulation conditions are expected to occur; therefore, conditions under the this alternative would be identical to those under existing conditions.

Because the No Project Alternative would result in no change to existing traffic and circulation conditions, this impact is considered less than significant. The No Project Alternative, however, would not meet the goals and objectives of the NSCARP.

Alternative 2 - Entire NSCARP

Impact TRA-1: NSCARP potentially would cause an increase in local traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).

Discussion: Construction activities would result in increased truck and construction equipment traffic on project area roadways. Table 3.14-5 summarizes the number of construction vehicles.

Table 3.14-5. Construction Vehicle Assumptions

Component	Light-Duty Trucks	Heavy Duty Trucks
Pipelines	30	10
Reservoirs	20	10
Pump Stations	20	10

Details regarding hours of proposed construction have not yet been formalized as of the preparation of this draft document; however, generally such hours would be limited to the daytime hours (7:00 a.m. to 7:00 p.m. Monday through Friday), with no construction occurring during evening or nighttime hours. In general, project-related hauling and deliveries may be dispersed throughout the day; thus, lessening the effect on peak-hour traffic. The SCWA would also obtain all necessary local road encroachment permits prior to construction and would comply with all the applicable conditions of approval.

Haul trucks and heavy equipment usually travel more slowly than regular traffic and require more time to enter and exit the flow of traffic. These trucks and equipment may cause traffic congestion in the surrounding area, especially during peak hours. Construction-related activities would temporarily increase traffic load and capacity. Only construction activities along pipelines would create a potentially significant impact that would require mitigation. The SCWA has committed to preparing and implementing a Traffic Control Plan (see Mitigation Measure TRA-1) during the project construction phase.

For the operational and maintenance aspect of the NSCARP, the additional traffic generated would be very minimal, approximately four vehicles per month (as assumed in the Air Quality analysis). With implementation of Mitigation Measure TRA-1 Traffic Control Plan, project impacts would be less than significant.

Pipeline Construction Traffic

Traffic-generating construction activities related to the construction of the pipelines would consist of the daily arrival and departure of constructions workers, trucks hauling equipment and materials to the construction site, the hauling of excavated soils, and importing of new fill. The pipelines would be located in the paved cross-section of several public roadways in the project area, in addition to overland routes. Construction equipment used for the proposed project would include concrete trucks, back-hoes, paving equipment, and periodic delivery of pipes. Construction would include the transportation of oversize loads, such as trucks carrying pipes. Using the assumptions created for the Air Quality Analysis (see Section 3.3 Air Quality), it is possible that an estimated construction crew of 40 workers per day (at worst-case) would be used for construction of the pipelines.

The proposed alignment would follow within and/or across a number of existing roadway rights-of-way. The placement of the pipeline in the roadways would temporarily disrupt existing transportation and circulation patterns in the vicinity. Impacts would include direct disruption of traffic flows and street operations as well as a reduction in travel lanes. Construction-work within and/or across high regional arterials may potentially affect traffic flow and operations at these locations; however, these arterials generally operate at satisfactory or better LOS. In addition, the primary regional route through the area (U.S. 101) would not be significantly affected.

Prior to pipeline construction, staging areas would be prepared for materials delivery, storage. As pipeline construction proceeds along a route, the staging area may also be moved to minimize hauling distances and avoid disrupting any one area for extended periods of time. Typically, contractors are expected to negotiate short-term temporary easements for staging areas. The location of the staging areas would be determined by the contractor and would generally be located every three miles along the pipeline alignment. The construction of the staging area would increase construction worker and heavy-duty truck trips along regional and local roads near the staging areas.

Assuming a total construction crew of 40 workers per day at maximum, construction worker trips traveling to and from the work site are anticipated to average 30 round trips (60 one-way trips) per day for light-duty vehicles and ten round trips (20 one-way trips) for heavy duty trucks. This assumes a worst-case scenario of one vehicle per worker, although in standard practice there would likely be some degree of carpooling. The Traffic Control Plan would include a measure encouraging carpooling. Including both light-duty vehicle trips and heavy-duty truck trips, there would be a maximum total of 40 round trips per day.

If the construction zone were to reduce the number of travel lanes during peak traffic periods, the NSCARP could significantly affect roadway segments and intersections on all segments adjacent to or in the roadway by causing either roadway or intersection levels of service to be unacceptable. The decrease in traffic volumes outside the peak periods typically, but not universally, is sufficient to allow the reduced number of travel lanes to accommodate the traffic flow without significant delays. Delays also would be experienced by drivers during off-peak hours, but because of the lower volume during that time of the day, fewer people would be affected by the delays during those periods. Roadways that would not accommodate the construction zone would require detours or road closures, if available. However, this effect is intended to be kept to a minimum.

As discussed above, project construction activities could generate up to 30 off-site construction worker light-duty vehicle round trips (60 one-way trips) and ten off-site truck round trips (20 one-way trips) per day. These project-generated trips would not be substantial relative to existing volumes on roadways in the affected areas, and would fall within the daily fluctuations of traffic volumes for these roadways. Therefore, this short-term increase in vehicle trips would not significantly affect level of service and traffic flow on roadways and would not represent a long-term impact. Additionally, once constructed, the pipelines would require maintenance and inspection; however, would not result in a noticeable increase in traffic in the project area.

Reservoirs

An estimated average crew size of 30 (at maximum) is anticipated to generate 30 round trips (60 one-way trips) from construction workers traveling to and from each work site on an average day. This includes workers traveling in both light-duty vehicles and heavy-duty trucks. Carpooling per the Traffic Control Plan would likely further reduce these trips. Included in this assumption is the delivery of construction components and material excavation. These round trips would occur per construction day over a maximum of two construction seasons per reservoir.

Maintenance of the storage reservoirs would require routine maintenance trips, inspection, and vegetation management activities. Maintenance activities would not increase above existing levels that are employed to maintain the existing facilities and therefore, would not result in an increase in traffic in the project area.

Pump Stations

An estimated average crew size of 30 (at maximum) is anticipated to generate 30 round trips (60 one-way trips) from construction workers traveling to and from each work site on an average day. This includes workers traveling in both light-duty vehicles and heavy-duty trucks. Included in this assumption is the delivery of construction components and material excavation. These round trips would occur per construction day over an approximately six-month period for each pump station.

Construction of the pump stations would generate both construction worker and truck delivery trips. The estimated average maximum crew size of 30 is not anticipated to exceed 30 total round trips (60 one-way trips) from construction workers traveling to and from each work site on an average day. Heavy-duty trucks would account for approximately ten round trips per day of the 30 total (at worst-case) for the delivery and hauling of construction materials and equipment. The remaining 20 round trips would result from worker trips in light-duty vehicles, although this is also a worst-case scenario. Per the Traffic Control Plan measure encouraging carpooling, it is likely this number of trips would be reduced. These project-generated trips would not be substantial relative to existing volumes on roadways in the affected areas, and would fall within the daily fluctuations of traffic volumes for these roadways. Therefore, this short-term increase in vehicle trips would not significantly affect level of service and traffic flow on roadways. Furthermore, construction of the pump stations themselves would not require public road or lane closures.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 1

Mitigation Measure TRA-1:

A. The SCWA shall adopt and implement a Traffic Control Plan prior to commencing project construction, which will include measures for reducing construction-related impacts to traffic and accessibility within the project area. The Traffic Control Plan shall include, but not be limited to, the following measures:

- Coordinate with the affected residents, businesses and agencies regarding construction hours of operation and lane closures;
- Follow guidelines of the local jurisdiction for road closures caused by construction activities;
- Coordinate with the Sonoma County Transit System and the applicable school districts on construction hours of operation, lane closures, and temporary bus route delays;
- Encourage construction contractors to carpool to and from work sites to reduce overall number of worker-vehicle trips;
- Limit lane closures during peak commuting hours to the extent possible;
- Install traffic control devices as specified in the Caltrans' Manual of Traffic Controls for Construction and Maintenance Works Zones;
- Provide public notification of road closures and detour routing for all vehicle detours and lane shifts in the immediate vicinity of the open trenches in the construction zone;
- Provide access to driveways and private roads outside the immediate construction zone;
- Develop a business notification plan for access to local business in and adjacent to the construction zone;
- Provide notification to the public of temporary closures of sidewalks, bicycle lanes, and recreation trails; and,
- Consult with emergency service providers and develop an emergency access plan for emergency vehicles access in and adjacent to the construction zone.

B. The SCWA shall obtain and comply with local road encroachment permits for roads that are affected by construction activities prior to any construction activity within public roads and rights-of-way.

Impact after Mitigation: Less than Significant. Implementation of the Traffic Control Plan (Mitigation Measure TRA-1) would alleviate significant impacts caused by construction activities (i.e. lane closures) to the extent feasible. Construction-related traffic impacts would be temporary and would not result in any long-term degradation of operating conditions or LOS throughout the NSCARP area. Impacts from movement of construction vehicles at the various pipeline-work locations would generate short-term and intermittent lessening of roadway capacities due to their slower movement and turning radii. Furthermore, the majority of these construction activities would occur in unincorporated areas of the County and not affect intercity roadways in the cities of Healdsburg, Windsor and Cloverdale.

Impact TRA-2: NSCARP potentially could exceed, either individually or cumulatively, a level of service standard established by the County congestion management agency for designated roads or highways.

Discussion: Sonoma County General Plan Objective CT-2.1 states that the countywide roadway system shall operate at a LOS "C" or better unless Figures CT-2c and CT-2d indicate worse levels of service. Figures CT-2c and CT-2d show that within the project area, U.S. 101 from the Healdsburg Avenue Interchange to the Lytton Springs Road Interchange (in the north- and southbound directions) operates at LOS D. Construction activities along U.S. 101 are not proposed as part of the project.

The Sonoma County General Plan 2020 General Plan Update, 2006 Draft EIR evaluated the AM and PM peak hour levels of service on the countywide roadway system. Based on the traffic counts collected for the General Plan Update DEIR, a majority of the countywide roadway system operates at LOS A. Table 3.14-6 shows existing levels of service for project area roadway segments for the AM and PM peak hours:

Table 3.14-6. Levels of Service for Select Project Area Roadways

Roadway Segment	North or East AM LOS	North or East PM LOS	South or West AM LOS	South or West PM LOS
Alexander Valley Road/Lytton Station Road	A	A	A	A
Crocker Road/River Road	A	A	A	A
Dry Creek Road/Lambert Bridge Road	A	A	A	A
Eastside Road/Trenton-Healdsburg Road	A	A	A	A
Westside Road/Felta Road	A	A	A	A

Source: Sonoma County General Plan 2020, General Plan Update, DEIR, 2006 (Appendix 7.6)

The data in Table 3.14-6 indicate that project area roadways analyzed for the General Plan Update DEIR operate at an acceptable level of service. Operation and maintenance activities would contribute minimal numbers of additional traffic trips and would not contribute to a worsened level of service for project area roadways; however, construction activities would have the potential to result in temporary decreases in the levels of service.

Construction activities may result in temporary lane closures, which have the potential to result in traffic delays and traffic congestion within the project area and also result in temporary decreases in the level of service. As described under Impact TRA-1 above, SCWA would prepare and implement a Traffic Control Plan, which would identify construction procedures that would limit lane closures and decreased LOS to the shortest duration practicable. Due to the temporary nature of this impact, it is considered less than significant; however, preparation and implementation of a Traffic Control Plan for construction activities would further minimize Impact TRA-2.

Impact Category: Less than Significant

CEQA Threshold of Significance Criteria: 1, 2

Mitigation Measures: None required

Impact TRA-3: NSCARP construction potentially could substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Discussion: Construction activities would occur along public roadways and rights-of-way (for pipeline installation and for hauling materials for pumping station construction), and on private lands (for reservoir construction). Construction traffic and pipeline construction activities have the potential to damage project area roadways resulting in hazardous driving conditions.

As described in Chapter 2 Project Description - General Construction Measures, SCWA would require the construction contractor(s) to restore affected roadways to pre-existing conditions or better upon the completion of construction activities. Because project area roadways would be restored, thereby reducing potential post-construction driving hazards, this impact is considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 3

Mitigation Measures: None required

Impact TRA-4: NSCARP construction potentially could result in significant traffic delays resulting in inadequate emergency access.

Discussion: Pipeline installation would cause temporary lane closures due to mobilization of construction equipment; stockpiling lengths of piping along pipeline alignments; delivery of gravel, asphalt, and water for pipeline trenches; pavement restoration; soil compaction and dust control; breaking and removing pavement; excavation of pipeline trench; and, installation of pipe sections.

Construction activities could temporarily disrupt emergency vehicle response times to locations within and adjacent to the project area. Implementation of the Traffic Control Plan would ensure safe and efficient traffic movement throughout the project area. The Traffic Control Plan would identify alternative emergency access routes, where feasible, to avoid the construction zone. The SCWA would provide alternate route information signage and other information to alert motorists, cyclists, and pedestrians of potential delays.

Temporary lane closures would have the potential to disrupt emergency vehicle response times. As discussed in Mitigation Measure TRA-1 - Traffic Control Plan, the SCWA and its contractors would coordinate construction planning and scheduling with local emergency response and service providers and would incorporate emergency services vehicle routing consideration into the construction-period Traffic Control Plan.

Construction activities would be coordinated with local command centers for emergency response and service agencies, including the Sonoma County Sheriff's Department, the California Highway Patrol, and the Sonoma County Department of Emergency Services Fire Division Services personnel to incorporate emergency vehicle circulation into the construction-period Traffic Control Plan to ensure that adequate access for emergency vehicles would be available at all times. This coordination would ensure that traffic lanes within the project area or alternative routes would be available for emergency vehicle trips. With the preparation and implementation of the Traffic Control Plan, this impact is considered less than significant.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 4

Mitigation Measure: Implement Mitigation Measure TRA-1

Impact after Mitigation: Less than Significant. Impacts would be less than significant after incorporation of mitigation.

Impact TRA-5: NSCARP potentially could result in inadequate parking capacity (especially during construction activities) or inadequate business/residence access.

Discussion: Construction activities would create a temporary increase in demand for parking by workers, material suppliers, and construction equipment within the construction easements or in designated off-street parking areas.

The Traffic Control Plan would identify project staging areas, which would provide parking for construction worker vehicles, construction equipment not in use, and storage for materials. As identified in the Traffic Control Plan, designated areas within the construction easements would be designed to accommodate all construction-related activity, and the staging areas would be maintained for parking throughout the duration of the construction at each site.

Construction activities would have the potential to temporarily disrupt access to businesses and residences within the project area. SCWA would notify businesses and residences in advance of construction activities that have the potential to impact access. Due to the temporary nature of this impact, it is considered less than significant; however, preparation and implementation of Traffic Control Plan for construction activities would further minimize Impact TRA-5.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 5

Mitigation Measure: Implement Mitigation Measure TRA-1

Impact after Mitigation: Less than Significant. Impacts would be less than significant after incorporation of mitigation.

Impact TRA-6: NSCARP potentially could conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

Discussion: The Sonoma County Transportation Authority (SCTA) Countywide Bicycle Plan 2003 Update identifies proposed and future bicycle routes, lanes, and paths (collectively referred to hereafter as routes) within the project area. Proposed bicycle routes are those for which funding has been identified. Within the project area, the following corridors have been identified as proposed bicycle routes:

- Class II Bicycle Lane on Healdsburg Avenue/Lytton Springs from Alexander Valley Road to Geyserville Avenue;
- Class II Bicycle Lane on Dry Creek Road from Kinley Drive to Skaggs Road;
- Class II on River Road from Laguna Road to Westside Road; and,
- Class II on Asti Road from Geyserville Avenue to Cloverdale Boulevard.

The remainder of the bicycle routes identified in the SCTA Countywide Bicycle Plan 2003 Update is future projects for which no funding has currently been identified. Because the future development of a countywide bicycle network and the specific design requirements that may be associated with such a network are currently unknown, specific design features have not been established or incorporated into the design of the NSCARP.

Construction activities may result in temporary lane closures, which have the potential to result in disruptions to transit services and bicycle and pedestrian movement. The SCWA would coordinate with transit service providers within the project area to ensure a safe and efficient transit route for the duration of the construction period. Signage would also be displayed along affected roadways to alert bicyclists and pedestrians of potential delays resulting from construction activities. Due to the temporary nature of this impact, it is considered less than significant; however, preparation and implementation of the Traffic Control Plan for construction activities would further minimize Impact TRA-6.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 6

Mitigation Measures: Implement Mitigation Measure TRA-1

Impact after Mitigation: Less than Significant. Impacts would be less than significant after incorporation of mitigation.

Alternative 3 – Alexander Valley-Jordan Reservoir Subset

This alternative represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C Reservoirs. This alternative would serve a smaller service area commensurate with the amount of potential storage capacity at the two proposed reservoir sites and potential summer recycled water supplies available from the ALWSZ treatment plant. As such, impacts to transportation/traffic would be similar to Alternative 2, but smaller in scale.

Under Alternatives 2, 3, and 4, the number of construction vehicles would be the same (see discussion of construction equipment emissions in Section 3.3 Air Quality); however, for Alternative 3, the length of the construction period would be approximately 20 percent that of Alternative 2, or two years. Therefore, the duration of impact would be significantly less for Alternative 3. Mitigation measures implemented for Alternative 2 to reduce significant impacts to less than significant impacts would also be applied to Alternative 3.

Alternative 4 – Russian River-Westside Subset

This alternative represents a scaled-down version of the Russian River Valley subarea. It limits storage reservoir development to the Russel-Bucher, Bucher, and Becnel #2 reservoir sites and utilizes the existing Gallo Twin Valley Reservoir. This alternative involves serving a smaller service area than the Russian River Valley subarea commensurate with the potential storage capacity that has been identified in the hills west of Westside Road, and potential summer recycled water supplies available from the ALWSZ. As such, impacts to transportation/traffic would be similar to Alternative 2, but smaller in scale.

Under Alternatives 2, 3, and 4, the number of construction vehicles would be the same (see discussion of construction equipment emissions in Section 3.3 Air Quality); however, for Alternative 3, the length of the construction period would be approximately 10 percent that of Alternative 2, or one year. Therefore, the duration of impact would be significantly less for Alternative 4. Mitigation measures implemented for Alternative 2 to reduce significant impacts to less than significant impacts would also be applied to Alternative 4.

Under Alternatives 2, 3, and 4, the number of construction vehicles would be the same (see discussion of construction equipment emissions in Section 3.3 Air Quality); however, for Alternative 4, the length of the construction period would be approximately ten percent that of Alternative 2, or one year. Therefore, the duration of impact would be significantly less for Alternative 4. Mitigation measures implemented for Alternative 2 to reduce significant impacts to less than significant impacts would also be applied to Alternative 4.

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3.15 UTILITIES/SERVICE SYSTEMS

This section addresses the potential for the NSCARP to impact existing public facilities and services, such as buried utility lines. This section also addresses impacts upon law enforcement, fire protection, and emergency response services, as well as local schools and other public institutions. Mitigation measures are identified and prescribed to reduce or avoid any potential impacts.

3.15.1 Physical Setting

Public Utilities

The following is a list of utilities within the project area:

- AT&T - Telephone Lines
- Comcast - Cable TV
- City of Healdsburg – water and wastewater
- City of Santa Rosa - Geysers Pipeline
- Geyserville - water
- PG&E - Electric Lines and natural gas
- SCWA – water and wastewater

Water Services

The SCWA provides surface water and groundwater for a variety of uses, including agricultural and residential. The SCWA also controls floodwaters. Most uses in unincorporated areas of Sonoma County draw potable water from on-site wells or small cooperative water systems, which use well-water. The SCWA service area is shown in Figure 3.15-1.

The SCWA maintains approximately 79 miles of underground pipeline extending from the Russian River to the communities of Santa Rosa, Cotati, Petaluma, and Sonoma. The pipes range in size from 16 inches to 48 inches in diameter, and provide service to a population of approximately 600,000.

Wastewater

Since 1995, the SCWA has managed the County's sanitation zones and districts, which provide wastewater treatment, reclamation, and disposal for approximately 22,000 residences and businesses. Each sanitation zone and district operates under unique, individual permits from the Regional Water Quality Control Board (San Francisco and North Coast regions) that set the requirements for operation (Sonoma County Water Agency, 2005). The SCWA provides wastewater service for certain unincorporated areas of the county such as Guerneville, Geyserville, and Larkfield/Wikiup/Airport. However, most of the unincorporated parts of the County utilize individual septic systems.

Fire Services

The Sonoma County Department of Emergency Services, Fire Division (Division) coordinates all service activities in the unincorporated areas of Sonoma County. The Division provides plan-check and inspection services for fire-related code compliance in coordination with the County's Permit and Resource Management Department, and administers contracts for fire prevention, code enforcement and plan review for local fire districts. The Division also responds to emergency incidents as part of the Hazardous Materials Response Team, Fire Investigation Task Force, Emergency Operations Center staff and for fire ground supervision, along with local fire agencies and the State Department of Forestry (CDF). The County contracts with various municipal and district fire agencies, which provide backup services to volunteer companies.

The Sotoyome Volunteer Fire Company is responsible for responding to incidents within the Russian River portion of the NSCARP area, while no volunteer fire companies are assigned to the Alexander Valley and Dry Creek Valley portions of the NSCARP.

Police

The Sonoma County Sheriff's Department (Department) provides law enforcement, court security services, and detention services to the citizens of Sonoma County. The Department is comprised of approximately 660 employees and more than 100 volunteers. Servicing a county of over 1,600 square miles with a population of nearly 500,000, the Department is responsible for primary law enforcement services of the unincorporated area (Sonoma County Sheriff's Department, 2004).

Electricity, Gas, and Cable

PG&E provides electric power and natural gas to customers in the NSCARP area. PG&E relies on a variety of sources (e.g., hydroelectric, nuclear, geothermal, etc.) to provide energy to meet transportation, industrial, residential, and commercial energy needs. The City of Healdsburg provides its own electrical service.

Cable television and high-speed Internet services are provided to the project area by Comcast Cable, Inc. Telephone services are provided to the project area by AT&T.

Storm Drainage

Storm water within the NSCARP area drains into the Russian River watershed. Storm water drainage is under the management of different entities, including the SCWA, the City of Santa Rosa, the County of Sonoma, the Town of Windsor, and private property owners.

Solid Waste

The Sonoma County Waste Management Agency, formed in 1992, is the joint powers authority of nine cities and Sonoma County. The County utilizes the Central Landfill as its only landfill, along with five transfer stations located throughout the County. Currently, the Central Landfill, the County's only landfill, is closed and all solid waste is being transported to other landfills outside of the County.

Figure 3.15-1. SCWA Service Areas

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Schools

Five school districts are located within the NSCARP boundaries: Alexander Valley Union School District, Healdsburg Unified School District, West Side Union School District, Geyserville Unified School District, Pinet-Olivet Union Elementary School District, and Cloverdale Unified School District. Four school sites are located within the project area. Table 3.15-1 lists the schools and their addresses that are found within the project area.

Table 3.15-1. Schools Located Within the NSCARP Boundaries

School District	School	Address
Geyserville Unified School District	Buena Vista High School (Continuation, 9-12); Geyserville Community Day School (7-8); Geyserville High School (9-12); Geyserville Middle School (6-8)	1300 Moody Lane Geyserville, CA 95441
	Geyserville Elementary School (K-5)	21485 Geyserville Ave Geyserville, CA 95441
Alexander Valley Union School District	Alexander Valley School (K-6)	8511 Highway 128 Healdsburg, CA 95448
West Side Union School District	West Side School (K-6)	1201 Felta Road Healdsburg, CA 95448

Source: ESP, 2005

3.15.2 Regulatory Setting

Federal

At the federal level, the primary regulations relating to water services are associated with water quality. These laws and regulations include the Clean Water Act, the goal of which is pollution prevention, and the Safe Drinking Water Act (SDWA). The latter, enacted by Congress in 1974 and amended in 1986 and 1996, requires protection of drinking water and its source lakes, reservoirs, springs and groundwater wells. The SDWA divides the responsibility of ensuring safe drinking water among the USEPA, states, and local service providers. Local Jurisdiction Regulation

The purpose of the Sonoma County General Plan, Public Facilities and Services Element is to assess the current status of public services within the County in terms of system capacity and demand and to evaluate future capacity in relation to projected growth. The Public Facilities and Services Element provide a policy framework for future development with the intent to reduce uncertainty about service availability and cost. Table 3.9-3 identifies one goal, three objectives, and one policy of the General Plan that have been identified as having potential applicability to the NSCARP. Table 3.9-3 also provides a summary assessment of the NSCARP's consistency with each policy identified.

Public utilities are regulated by several entities, including (depending on the utility) the Federal Communications Commission, California Public Utilities Commission, and local ordinances.

State and Local

At the State level, there are two agencies that oversee water resources. The first is the State and Regional Water Quality Control Boards, which are responsible for the enforcement of the Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code). The Porter-Cologne Act deals with the potential discharges into water bodies that could result in a negative impact to water quality.

The second agency is the Department of Water Resources (DWR), whose mission is the overall management of California's water resources. The regulations overseen by DWR regarding water service availability include the California Urban Water Management Planning Act (California Act), and Senate Bills (SB) 610 and 221. The California Act, adopted in 1983, requires all urban water suppliers within the state to prepare an Urban Water Management Plan and update them every five years.

SBs 610 and 221 amended state law, effective January 1, 2002, are refinements to the California Act intended to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SBs 610 and 221 are companion measures, which seek to promote more collaborative planning between local water suppliers, cities, and counties. Refer to Section 3.8 Hydrology and Water Quality for a detailed discussion of these and other agencies and water-related legislative and statutory information. Refer to Section 3.9, Table 3.9.3 for a list of applicable goals, objectives, and policies of the Sonoma County General Plan regarding aesthetics.

3.15.3 Methodology

Review of the Sonoma County General Plan was conducted to determine standards for services provided for utilities and public service systems. Where additional specific information was required, Internet research was conducted and individuals were contacted.

Potential impacts to utilities and public services were evaluated by determining whether additional personnel employed to construct, operate, or maintain the NSCARP would increase demand for services in the study area. It has been estimated that operational and maintenance activities associated with the NSCARP would result in an approximate increased demand of four permanent employees for maintenance and operation and 50 temporary employees and construction workers per year over the 10-year construction period.

3.15.4 CEQA Thresholds of Significance Criteria

The impacts to Utilities/Service Systems were evaluated by determining whether additional personnel employed to construct, operate or maintain the NSCARP would increase demand for services in the study area as a result of implementation of the NSCARP. The evaluation criteria for Utilities/Service Systems impacts are presented in Table 3.15-2. These criteria are drawn from CEQA requirements and supplemented with applicable goals, objectives, and policies from the Sonoma County General Plan Public Facilities and Services Element. Utilities/Service Systems impacts would be considered significant if the project resulted construction or expansion of service system facilities, non-compliance with federal, state, or local regulations related to solid waste or disposal or wastewater treatment, or resulted in exceedance of existing landfill capacity.

Table 3.15-2. CEQA Evaluation Criteria /Thresholds of Significance

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will the NSCARP exceed wastewater treatment requirements of the North Coast Regional Water Quality Control Board?	Compliance with North Coast Regional Water Quality Control Board wastewater treatment requirements.	Greater than 0 exceedances.	CEQA Guidelines Appendix G, Checklist Item XVI(a)
2. Will the NSCARP require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects or result in inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	Need for new treatment facilities to serve/implement the project.	Construction or expansion of a wastewater treatment facility needed to serve/implement the project beyond existing or planned capacity.	CEQA Guidelines Appendix G, Checklist Items XVI(b) and (e)
3. Will the NSCARP require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	Need for new or expanded storm water drainage facilities.	Construction or expansion of a storm water drainage facility.	CEQA Guidelines Appendix G, Checklist Item XVI(c)
4. Will the NSCARP be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs and comply with federal, state, and local statutes and regulations related to solid waste?	Exceedance of landfill capacity and compliance with federal, state, and local regulations.	Project contribution exceeding existing and planned landfill capacity and greater than 0 violations of federal, state, or local regulations.	CEQA Guidelines Appendix G, Checklist Items XVI(f) and (g)
5. Will the NSCARP result in unrepaired damage or an extended disruption in service provided by a utility?	Damage to a service utility facility.	Permanent utility service disruptions.	Professional Judgment
6. Will the NSCARP result in the construction of new police protection, fire protection, and/or school facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	Need for new or expanded police protection, fire protection, and/or school facilities.	Construction or expansion of a police protection, fire protection, and/or school facility.	CEQA Guidelines Appendix G, Checklist Item XIII(a)
7. Will the NSCARP result in an exceedance of electrical capacity of the electrical service provider servicing the region?	Exceedance of available electrical supply servicing the region.	Project contribution exceeding existing and planned electrical supply capacity of the electrical service provider servicing the region.	Professional Judgment

3.15.4 Alternatives Analysis

Alternative 1 – No Project

Under the No Project Alternative, the NSCARP would not be built. As such, the adverse impacts associated with utility relocation would not occur under the No Project Alternative. Likewise, the beneficial impact associated with use of the tertiary treated wastewater would not occur under the No Project Alternative. Implementation of the No Project Alternative would result in a continuation of existing irrigation practices, and no changes would occur to existing utility services and public service needs within the project area; therefore, conditions under the this alternative would be identical to those under existing conditions.

Because the No Project Alternative would result in no change to existing utility services and public service needs, this impact is considered less than significant. The No Project Alternative, however, would not meet the goals and objectives of the NSCARP.

Alternative 2 – Entire NSCARP

Impact UTL-1: NSCARP could potentially exceed wastewater treatment requirements of the North Coast Regional Water Quality Control Board.

Discussion: NSCARP would not directly treat wastewater. Proposed reservoirs would provide storage of tertiary-treated wastewater supplied by the City of Santa Rosa Subregional Reclamation System, Airport-Larkfield-Wikiup Sanitation Zone, and/or the Town of Windsor Wastewater Treatment Facility for agricultural irrigation uses. The aforementioned facilities are required to comply with the California Water Code Divisions 2 and 7, which regulate water-recycling activities in California. This impact is considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 1

Mitigation Measure: None required

Impact UTL-2: NSCARP potentially could require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects or result in inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

Discussion: The proposed project would utilize tertiary-treated wastewater from regional wastewater treatment facilities for agricultural irrigation purposes. No additional wastewater treatment facilities would be required beyond those currently in place, and no expansion or construction of a new wastewater treatment facility would be required for implementation of the NSCARP. Furthermore, implementation of the proposed project would not result in a regional exceedance of wastewater treatment facility capacity. The Proposed Project would provide an alternative use for recycled water, alleviating potential capacity exceedance issues at the wastewater treatment facilities. This is considered a beneficial impact.

Impact Category: Beneficial

CEQA Threshold of Significance Criterion: 3

Mitigation Measure: None required

Impact UTL-3: NSCARP potentially could require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Discussion: Stormwater drainage facilities within the project area are primarily roadside ditches. Installation of recycled water pipelines and development of storage reservoirs would not increase impervious surfaces within the project area. Development of the pump stations associated with the NSCARP would result in an increase in impervious surface within the project area. Although this additional impervious surface within the project area would result in reduced water absorption and increased surface water runoff rates, the increase in impervious surface is minimal. The NSCARP involves the construction of eight booster pump stations (approximately 625 square feet each) and eight distribution pump stations (approximately 2,500 square feet each). Due to the size and dispersed nature of the proposed pump stations, the existing drainage system is anticipated to adequately accommodate storm water runoff associated with increased impervious surfaces within the project area. This impact is considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 3

Mitigation Measures: None required

Impact UTL-4: NSCARP potentially may require a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs and comply with federal, state, and local statutes and regulations related to solid waste.

Discussion: Solid waste generated by the project would be minimal and would be limited to construction debris, including asphalt and concrete generated by the installation of pipeline and roadway pavement. Solid waste disposal would occur in accordance with federal, state, and local regulations. Disposal would occur at permitted landfills with adequate capacity. Therefore, the proposed project would not generate the need for a new solid waste facility and the project's impacts would be considered less than significant.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 4

Mitigation Measures: None required

Impact UTL-5: NSCARP potentially could result in un-repaired damage or an extended disruption in service provided by a utility.

Discussion: Proposed pipelines would be installed primarily within existing public rights-of-way, except where short segments of pipeline approach storage reservoirs or agricultural irrigation areas. Construction activities associated with pipeline installation have the potential to result in relocation of utilities within the project area. Relocation would be coordinated among the SCWA, construction contractors, and the various utility companies to ensure that the relocations are consistent with the project schedule and project design.

The NSCARP's components would run parallel to and cross under or over, or be situated adjacent to these utilities. Utility conflicts may occur at intersections in which a number of pipelines cross. The proximity of wastewater lines, in particular, may complicate the construction of proposed project's components, as DHS regulations require a four-foot horizontal separation between parallel water and disinfected tertiary recycled water lines, and a one-foot vertical separation for crossing water and disinfected tertiary recycled water lines.

No major disruptions in service are anticipated during the development and installation of relocated or new replacement utilities; however, it is possible that short-term disruption of service could occur during interconnection of new facilities. Such disruptions would be of short duration (several minutes) and all affected businesses and residents for whom services may be temporarily disrupted would be notified in advance. However, in the event that disruptions were to occur, it is anticipated that they would be of limited duration. Although impacts would generally be minimal, Mitigation Measures UTL-1 and UTL-2 are recommended to ensure that impacts would fall below the significance threshold. With implementation of these measures, there would be a less than significant impact under CEQA.

Impact Category: Significant but Mitigable

CEQA Threshold of Significance Criterion: 5

Mitigation UTL-5:

A. The SCWA shall identify utilities along the affected portions of the NSCARP prior to construction. For locations with adverse impacts, the following mitigations shall be implemented:

- Utility locations shall be verified through the use of the Underground Service Alert services and/or field survey (potholing);

- As necessary, detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and fill of areas around utility cables and pipes. All affected utility services shall be notified of construction plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services;

- In areas where the pipeline would parallel underground utility lines within five feet, the SCWA shall employ special construction techniques. These special measures, which shall be included in the engineering specifications, shall include trench wall-support measures to guard against trench wall failure and possible resulting loss of structural support for the excavated areas; and,

- Residents and businesses in the project corridor shall be notified of any planned utility service disruption two to four days in advance, in conformance with county and state standards.

B. In conjunction with Mitigation Measure UTL-1, the following measures shall be implemented:

- Disconnected cables and lines shall be reconnected promptly;

- The SCWA shall observe DHS standards which require (1) a 4-foot horizontal separation between parallel disinfected tertiary recycled water lines and water mains (gravity or force mains); and (2) 1-foot vertical separation between perpendicular water and disinfected tertiary recycled water line crossings (water line above recycled water line). In the event that separation requirements can not be maintained, the SCWA shall obtain DHS variance; and,

- The SCWA shall coordinate final construction plans and specifications with affected utilities.

Impact after Mitigation: Less Than Significant. Implementation of Mitigation Measures UTL-5 would reduce impacts to a level of less than significant.

Impact UTL-6: NSCARP potentially could result in the need for new or expanded police protection, fire protection, and/or school facilities.

Discussion: As discussed in Section 3.11 – Population and Housing, the proposed Project would employ up to 50 workers throughout the construction period and may require up to four additional employees for operation and maintenance services. The additional employment is part of the anticipated growth expected within the County and; therefore, would not alter the ratio of service personnel or facilities to population or employment.

NSCARP would not include housing elements that would increase human presence in the area thereby requiring additional or expanded school facilities. Personnel employed to operate and maintain the project would not substantially alter the ratio of school capacity to population; therefore, the project would not result in an increased demand for schools.

Impact Category: No Impact

CEQA Threshold of Significance Criterion: 6

Impact UTL-7: NSCARP potentially could exceed planned electrical supply capacity of the electrical service provider servicing the region.

Discussion: Construction-related activities and operation of the NSCARP would require the use of non-renewable energy sources. Construction equipment would be powered primarily by gasoline, diesel, and/or generators. For the purpose of this analysis, it is assumed that construction power demands for both gas and electricity to operate machinery and equipment would be a one-time incremental demand and would not create a significant increase in demand for power in the area.

Operation of the pump stations (ranging from 40 horsepower (hp) to 1,150 hp) would require an electrical supply to convey the recycled water throughout the NSCARP area. Using an approximate kilowatt per year (kw/yr) electrical consumption, there would be an incremental increase of approximately 2.72 kw/yr per unit of horsepower for the NSCARP. Table 3.15-3 summarizes total horsepower from all distribution and pump stations and kw/yr for each subarea.

Table 3.15-3. NSCARP Pump Stations Energy Consumption

Subarea	Total Horsepower	Total kw/yr
Alexander Valley	1,690	4,596.8
Dry Creek Valley	1,790	4,868.8
Northern Alexander Valley	1,300	3,536
Russian River Valley	1,870	5,086.4
Total	**6,650**	**18,088**

For Alternative 2, there would be an approximate incremental energy usage increase of 18,088 kilowatts per year. Pumping during peak energy usage times would increase the operating costs and demands on the electrical infrastructure. However, not all of the pumping stations would be operated simultaneously. Furthermore, pumping operations would be adjusted to minimize the overall peak energy demand.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 7

Alternative 3 – Alexander Valley-Jordan Reservoir Subset

This alternative represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C Reservoirs. This alternative would serve a smaller service area commensurate with the amount of potential storage capacity at the two proposed reservoir sites and potential summer recycled water supplies available from the ALWSZ treatment plant. As such, impacts to utilities and service systems would be similar to Alternative 2, but smaller in scale.

In terms of energy usage (discussed in Impact UTL-7), one booster station (Jordan) would operate at 500 hp, with an operational energy consumption rate of approximately 1,360 kw/yr.

Mitigation measures implemented for Alternative 2 to reduce significant impacts to less than significant level would also be applied to Alternative 3.

Alternative 4 – Russian River-Westside Subset

This alternative represents a scaled-down version of the Russian River Valley subarea. It limits storage reservoir development to the Russel-Bucher, Bucher, and Becnel #2 reservoir sites and utilizes the existing Gallo Twin Valley Reservoir. This alternative involves serving a smaller service area than the Russian River Valley subarea commensurate with the potential storage capacity that has been identified in the hills west of Westside Road, and potential summer recycled water supplies available from the ALWSZ. As such, impacts to utilities and public services would be similar to Alternative 2, but smaller in scale.

In terms of energy usage (discussed in Impact UTL-7), one booster station (Bucher), and two distribution stations (Russell-Bucher, Gallo Twin Valley) would operate at 1,000, 360, and 150 hp, respectively. Alternative 4 would result in an approximate increase of 4,107 kw/yr.

Mitigation measures implemented for Alternative 2 to reduce significant impacts to less than significant impacts would also be applied to Alternative 4.

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Chapter 4

Cumulative Impacts

Chapter 4. Cumulative Impacts

4.1 INTRODUCTION

The purpose of this chapter is to provide an analysis of the cumulative impacts that may result from the NSCARP in combination with other related projects, and to present potential mitigation measures for the identified cumulative impacts. Background information on related projects and the methodology used to analyze cumulative impacts are also discussed to provide the reader with a context for the analysis of cumulative impacts.

State CEQA Guidelines and NEPA regulations require that cumulative impacts of a proposed project be addressed in an EIR/EIS when the cumulative impacts are expected to be significant and, under CEQA, when the project's incremental effect is cumulatively considerable. NEPA does not provide specific guidance as to how to conduct a cumulative impact assessment, whereas cumulative impact assessment requirements under CEQA do provide specific guidance and are consistent with and more stringent than under NEPA.

This analysis includes the overall impacts of the proposed NSCARP combined with adopted 1989 General Plan development trends and policies and reasonably foreseeable future Draft GP 2020 trends producing related or continued impacts, as required by Section 15130 of CEQA Guidelines (State CEQA Guidelines). The goal of this analysis is twofold: (1) to determine whether the overall long-term impacts of these trends and policies would be cumulatively significant; and, (2) to determine whether the proposed project would cause a "cumulatively considerable" (and thus significant) incremental contribution to any cumulatively significant impacts. (See State CEQA Guidelines Sections 15130[a]-[b], 15355[h], 15065[c]; Communities for a Better Environment v. California Resources Agency [2202] 103 Cal.App.4th 98, 120.)

This cumulative analysis assesses the proposed project's incremental contribution to anticipated cumulative impacts in the NSCARP area to a County or other regional scale, depending on the issue area. The analysis then determines whether the proposed project creates an incrementally significant contribution to any cumulative impact.

Cumulative impacts are defined in State CEQA Guidelines Section 15355 as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact occurs from "the change in the environment which results from the incremental impact of the proposed project when added to other closely related past, present, and reasonably foreseeable probable future projects." Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (State CEQA Guidelines Section 15355[b]).

Consistent with State CEQA Guidelines Section 15130(a), the discussion of cumulative impacts in this EIR/EIS focuses on significant and potentially significant cumulative impacts. State CEQA Guidelines Section 15130(b), in part, provides the following guidance:

> "The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great as detail as is

> provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the attributes of trends and policies contribute rather than the attributes of those which do not contribute to the cumulative impact."

This EIR/EIS identifies potentially significant environmental impacts associated with implementation of the NSCARP (see Chapter 3). These issues, and others that could contribute considerably to cumulatively significant effects, are discussed in the issue area background and impact analysis in the context of cumulative development.

4.2 CUMULATIVE IMPACTS DISCUSSION

The State CEQA Guidelines identify two basic methods for establishing the cumulative environment in which the project is to be considered: 1) the use of a list of past, present, and reasonably anticipated future projects; or, 2) the use of adopted projections from a general plan or other regional planning document. The cumulative analysis of this EIR/EIS is based on trends and projections outlined in the County's 1989 General Plan within the NSCARP region and the County. Although the more current Draft GP 2020 is not significantly different in scope and analysis than the previously adopted 1989 General Plan, legal precedents require impact analysis to be based off an adopted general plan's policies and development trends. As such, the cumulative impacts section bases the cumulative analysis on the 1989 General Plan, but includes information from the Draft GP 2020 and its corresponding EIR, which uses current setting information. In general, ongoing development trends and goals, objectives, and policies of the Draft GP 2020 are qualitatively similar to those found in the 1989 General Plan.

4.2.1 Issue Area Background

Land development in the County, has the potential to impact physical resources, such as hydrology and water resources, biological resources, geology, and agricultural resources. For example, it has the potential to impact water quality through increased erosion and sedimentation during project construction and also to result in increased runoff and streambank erosion due to changes to existing drainage patterns and increases in impervious surface areas. In terms of biological resources, growth within the County has the potential to result in the loss of populations or essential habitat for special-status species, the loss of sensitive natural communities, or to create impacts to wetlands.

In regard to agricultural lands, growth and expansion of the nine incorporated cities within Sonoma County would contribute to the conversion of agricultural lands to non-agricultural uses. City growth would also require public services and infrastructure that may be located in the unincorporated area. The contribution of city growth to impacts from such projects to physical resources currently cannot be quantified given the conceptual nature of where future services and infrastructure would be located in the unincorporated area. Nevertheless, given the scale of city growth, it is reasonable to assume that such growth between now and 2020 would result in substantial impacts to the County's physical resources.

The following outlines general trends and projections pertaining to each EIR/EIS issue area on a Countywide basis, using the 1989 General Plan for impact analysis, and augmented with information from the Draft GP 2020 and Draft GP 2020 EIR, where appropriate:

Aesthetics*.* Land uses and development consistent with the 1989 General Plan could impact the visual quality of Community Separators, Scenic Landscape Units, Scenic Corridors, and Scenic Highways. Policies contained in the 1989 General Plan, Draft GP 2020 and the Sonoma County Code would continue to limit the intensity, density, and location of development within these areas. However, impacts related to construction activities for the NSCARP and other similar projects, although temporary, could be potentially significant depending on the timing of such projects.

Agricultural Resources*.* Policies of the nine incorporated cities and the 1989 General Plan limit the extent of major expansions that would result in significant loss of agricultural land. Land use planning for the three agricultural use categories, “Land Intensive Agriculture”, ”Land Extensive Agriculture”, and “Diverse Agriculture”, guide management and protection of agricultural resources through density policies. Permitted uses, residential densities and development criteria contained in the 1989 General Plan are designed to enhance and protect agricultural land and protect agricultural viability.

Air Quality*.* Air quality impacts related to growth in the cities and the cumulative impacts of development projects and construction activities will increase in the coming years. Particulate emissions would increase as a result of wood stove emissions and construction dust. Additionally, increases in traffic congestion and an upward trend in travel demand would incrementally add to pollutant emissions in the project area.

Biological Resources. Sonoma County has many areas with significant biological resources that are vulnerable to the impacts from land development. Land uses consistent with general development trends, types of uses and intensities of development would result in loss of populations or essential habitat for special-status species, as well as the loss of sensitive natural communities. Development projects in the unincorporated and incorporated areas could adversely affect wildlife habitat, and result in the obstruction of wildlife movement opportunities. Wetlands within areas planned for development and in the location of cumulative projects may be affected.

In general, 1989 General Plan goals and objectives focus on consistency between types of uses and development intensities and the preservation of significant biological resources. This focus, coupled with project mitigations and federal and state regulations, may result in fewer cumulative impacts in relation to future growth projections.

Cultural Resources. While impacts to cultural resources are generally limited to the proximity of a development site, growth would be expected to increase potential impacts on culturally sensitive resources. Cumulative development on the scale of projects such as NSCARP would require review and mitigation.

Environmental Justice. Because environmental justice issues legally pertain to only NEPA projects, potential cumulative impacts would be limited. Prior to 1994, environmental justice was not typically addressed in planning policy. The 1989 General Plan would not contribute to potentially significant cumulative impacts on environmental justice issues, except possibly in cases where specific projects would receive federal funding. Any NEPA projects would be subject to similar review and mitigation to ensure that cumulative impacts would be less than significant.

Geology and Soils. As population within the unincorporated areas, as well as the nine cities of Sonoma County grow, so would the opportunity for geologic and soil hazards to occur (e.g., seismic ground shaking and ground failure, landsliding, and subsidence). For example, land uses and development would have significant soil erosion impacts to the extent that any projects are not subject to discretionary project review.

Hydrology/Water Quality. In general, land use/development policies and growth projections contained in the 1989 General Plan could potentially increase demand on groundwater supply, and adversely affect groundwater conditions. This also applies to surface water supplies. However, the SCWA's Urban Water Management Plan (UWMP) suggests that groundwater pumping may be reduced after the UWMP is implemented, thereby working to offset demand (SCWA, 2006). Cumulative development patterns would potentially alter existing drainage patterns and place structures within the 100-year flood hazard areas. These impacts impede or redirect flood flows, resulting in secondary flood damage including bank instability and erosion. Increased impervious surfaces could also contribute to cumulative hydrology and water quality impacts.

Land Use and Population/Housing. Two primary sources of growth would influence the cumulative effects on land use, population, and housing from the NSCARP: 1) development allowed for under the 1989 General Plan and anticipated by the Draft GP 2020; and, 2) development within the incorporated cities of Healdsburg, Windsor, and Cloverdale, which are all within close proximity to the NSCARP project area. It is assumed that the NSCARP would have more potential direct and indirect impacts on the unincorporated County areas, as opposed to the incorporated jurisdictions.

Overall, growth rates slowed between 1990 and 2000, and under the Draft GP 2020's projections, growth rates will further decline. Additionally, population trends since the adoption of the 1989 General Plan have shown that the unincorporated areas of the County will comprise less of the overall population.

Noise. Transportation sources are by far the most significant sources of environmental noise in Sonoma County. They include vehicular traffic (especially trucks), rail operations, and aircraft overflights in the approach areas to airports. The Circulation and Transit Element of the 1989 General Plan includes policies intended to reduce traffic congestion and keep traffic flowing smoothly, thereby helping lower expected future noise levels. The Air Transportation Element includes policies limiting noise exposure from aircraft operations. Future land uses and development within the county would result in potential cumulative noise level increases along certain roadway segments and transit routes. It is possible that new noise-sensitive land uses and development consistent with development policies contained in the 1989 General Plan could occur adjacent to existing noise generating land uses at the fringe of the cities, or that new noise generating land uses could occur adjacent to noise sensitive uses at the fringe of cities.

Public Health and Safety. Existing regulations and 1989 General Plan policies and programs would reduce cumulative impacts associated with geologic, flood, fire, and transport/release of hazardous materials. The management of hazardous materials has become a major public safety issue requiring significant resources and attention by local agencies.

While different agencies have different responsibilities in the regulation of hazardous materials, the Health Department was designated as the lead agency for preparation of a County Hazardous Waste Management Plan. Cumulative project land uses and development could result in additional transport and and/or release of hazardous materials in the unincorporated area, including the NSCARP area. Please refer to Section 3.12 Public Health and Safety for a detailed discussion of impacts related to the NSCARP.

Transportation/Traffic. Future travel demand will continue to increase in the County from the projected population growth. Although the projected growth in the unincorporated area will continue to be slow and focused mainly on agriculture, urban development in the cities will exacerbate commute travel delays on U.S. 101 and its parallel routes.

Forecasted countywide travel demand for 2005 for the average weekday is 2,090,000 person trips; an increase of 52 percent over 1984 figures. The number of person-trips projected during the peak A.M. commute period is 225,100, an increase of 57 percent over 1984. Since most traffic congestion occurs during the peak commute periods, forecasts of home based work trips are especially important. About 17.6 percent of home based work trips are projected to be to jobs outside the county (1989 Sonoma County General Plan).

According to 1989 General Plan projections, with proposed improvements in 2005, all area roadways would function at LOS C or better on weekdays; however, large increases in traffic were expected on local roads in the Windsor area due to significant projected growth. Several area roadways in the NSCARP area and vicinity will continue to be affected by weekend recreational travel, including U.S. 101. West Street in Healdsburg, U.S. 101 south of Windsor River Road, and road segments in Central Windsor are expected to be moderately congested and operate below LOS C; however, these areas are outside of the NSCARP area. Information contained in the Draft GP 2020 shows that area roadways would continue to operate at better than LOS C in the near future. See Section 3.14, Transportation/Traffic for more information.

Utilities and Service Systems. As discussed in Section 3.15, Utilities and Service Systems, available future water systems vary by water provider and by source. Surface water supplies for the SCWA system are considered adequate to accommodate demand for those jurisdictions contracted with the SCWA. However, expansion of the delivery system and obtaining additional water rights must be completed before the available supply can be delivered. For those jurisdictions and areas that rely upon groundwater, there is greater uncertainty regarding the availability of water supplies. New or expanded water supply facilities will be needed, as well as additional water rights, to serve planned growth under the 1989 General Plan and Draft GP 2020.

Cumulative land uses and development could potentially generate wastewater flows that may exceed the treatment capacity of wastewater services and facilities in the nine cities and the unincorporated areas of the County. The increased demand would result in the need for new or expanded wastewater facilities. Additionally, projected development would generate solid waste streams that would exceed the disposal capacity of the Sonoma County Landfill by 2015.

4.3 IMPACT ANALYSIS

Evaluation of the significance of cumulative impacts from the NSCARP utilizes the CEQA thresholds of significance criteria for each individual NSCARP impact section contained in

Chapter 3.0; however, the impact analysis is based upon criteria that include the potentially significant effects of the NSCARP plus development trends and policies within the project area, Sonoma County, and/or the region based on the adopted 1989 General Plan. Mitigation measures recommended for each issue area in Chapter 3.0 would serve to alleviate the effect from cumulative impacts. Thus, mitigation measures are not included in the cumulative impacts section unless the impacts from other cumulative projects or reasonably foreseeable development trends warrant additional mitigation.

Alternative 1 – No Project/Action

The “No Action” Alternative means that SCWA would not implement a regional water conveyance and storage project to serve recycled water to the project area. Because no project construction or operational activities would occur, there would be no cumulatively significant impacts related to implementation of NSCARP.

Alternative 2 – Entire NSCARP

Cumulative Impacts – Aesthetics: The NSCARP could potentially contribute to cumulatively significant impacts to aesthetics and visual resources.

> **Discussion:** Land uses and development consistent with the 1989 General Plan could impact visual character and scenic resources, although policies contained in the Open Space Element are designed to limit the visual impacts of development. Development within the NSCARP area, could potentially impact portions of Scenic Corridors, Scenic Highways, and/or Community Separators (see Section 3.1 – Aesthetics, for a discussion).
>
> NSCARP components have been determined to have significant impacts on visual character and scenic resources as a result of construction activities. Such activities would result in a temporary strong visual contrast with the rural and urban landscape edges within the right-of-ways immediately adjacent to private residences, recreation areas, or public use areas along the pipeline routes. During construction on pipeline routes, reservoirs, and pump stations, excavated areas, stockpiled soils, and other materials within the construction easement and staging areas would constitute negative aesthetic elements in the visual landscape. Therefore, there would be a potentially significant, although temporary, impact on foreground views from these locations.
>
> Concurrent construction activities, including construction of the NSCARP, could potentially result in significant, although temporary, cumulative impacts to aesthetics. Mitigation Measure AES-1 would help to reduce cumulative short-term construction-related impacts to visual resources, such as Scenic Corridors and Community Separators.
>
> General land use and development patterns consistent with 1989 General Plan policies and continued by reasonably foreseeable future policies of the 2020 General Plan, could result in cumulative impacts from light pollution – a long-term operational impact. However, the NSCARP would not introduce new substantial and permanent sources of light. No reasonably foreseeable projects similar to NSCARP that would result in

significant numbers of new storage reservoirs are proposed in the area. As such, NSCARP would not contribute to cumulatively significant impacts on aesthetics.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1 through 3 (refer to Section 3.1, Table 3.1-2)

Mitigation Measures: None required

Cumulative Impacts – Agricultural Resources: The NSCARP could potentially contribute to cumulatively significant impacts to agricultural resources.

Discussion: Under Alternative 2, implementation of the NSCARP would result in the permanent loss of 0.76 acres of Prime Farmland, 2.2 acres of Farmland of Statewide Importance, 11.36 acres of Farmland of Local Importance, 27.7 acres of Unique Farmland, 231.53 acres of Grazing Land, and 74.28 acres of Other Land. Under Alternative 3, there would be a permanent loss of 3.52 acres of Unique Farmland and 46.78 acres of Grazing Land. For Alternative 4, there would be a permanent loss of 39.09 acres of Grazing Land. Mitigation Measure AG-1 would be implemented for each alternative; however, even with implementation of Mitigation Measure AG-1, NSCARP would result in a significant and unavoidable cumulative impact associated with the permanent loss of status Farmland.

The NSCARP would not require the permanent removal of crops associated with pipeline installation; however, impacts associated with the permanent loss of lands subject to Williamson Act Contracts resulting from reservoirs and pump stations are considered significant and unavoidable. Additionally, this conflict with the applicable Williamson Act Contracts plus the cumulative effects of growth as allowed under the 1989 General Plan, would also be significant and unavoidable.

The NSCARP would be used to irrigate existing farmland and provide an alternative source of irrigation water to the project area. Cumulative impacts to soil productivity as a result of implementation of the 1989 General Plan have already been identified as a less than significant impact due to low development densities and physical constraints outside of urban fringes; therefore, cumulative impacts to soil productivity as a result of topsoil erosion would also be less than significant.

Due to low constituent concentrations, accumulation of metals in soil from recycled water application is very low and would not affect long-term soil productivity. Furthermore, this impact occurs on a localized basis and would not create a cumulative impact on a larger scale. Even though there are agricultural lands proposed for irrigation as identified in the project description and Section 3.2 Agricultural Resources, there would be no interaction or overlapping of impacts such that the standard used as the CEQA significance threshold would be exceeded.

The 1989 General Plan and Draft GP 2020 EIR do not address cumulative impacts relating to introduction of the GWSS. Cumulative projects involving revegetation in the area could result in its introduction. This is because plant material could potentially be shipped in from areas outside the County which may be infested with the pest. Implementation of Mitigation Measure AG-5 would be required. Cumulative projects would also be subject to similar mitigation measures that would offset the risk related to introduction of the pest. Therefore, cumulative impacts from GWSS introduction are considered less than significant.

Impact Category: Significant and Unavoidable

CEQA Thresholds of Significance Criteria: 1 through 5 (See Section 3.2, Table 3.2-4)

Mitigation Measures: No mitigation measures available

Impact after Mitigation: Significant and Unavoidable. Due to the loss of status Farmland and conflicts with Williamson Act Contracts, cumulative impacts are considered Significant and Unavoidable.

Cumulative Impacts – Air Quality: The NSCARP could potentially contribute to cumulatively significant impacts to air quality.

Discussion: NSCARP Alternative 2 would result in the estimated emissions presented in Tables 3.3-4 and 3.3-5 of Section 3.3, Air Quality. However, quantitative BAAQMD significance thresholds are not applicable to the construction phase of impacts (BAAQMD, 1999). The BAAQMD's CEQA Guidelines state that determination of significance with respect to construction emissions should be based on consideration of implemented control measures. The NSCAPCD quantitative CEQA significance thresholds are applicable to both the construction and operational phases of proposed projects. However, the NSCAPCD annual mass significance thresholds are applied to only stationary sources of air emissions.

The BAAQMD and NSCAPCD-recommended control measures identified in Section 3.3.5, Mitigation Measures, have been incorporated into the project design to reduce construction emissions to a less than significant level. After implementation of these control measures, construction air quality impacts based on mass emissions significance thresholds (peak daily and peak annual) for Alternative 2 are less than significant.

Cumulative impacts from both the construction and operational phases of development projects allowable under the 1989 General Plan would be subject to required mitigation measures for construction and operation. It is not anticipated that these emissions would be cumulatively significant, as long as project emissions are mitigated per BAAQMD and NSCAPCD requirements. Simultaneous development projects in the NSCARP area could potentially create significant impacts over the long-term unless mitigated; however, as operational emissions resulting from NSCARP are minimal, this would not result in a cumulatively significant impact.

As all recommended PM_{10} control measures would be incorporated (see Section 3.3.3) and operational NSCARP emissions would be minimal, no conflict with the Clean Air Plan is expected to result from construction of Alternative 2. Additionally, construction impacts on sensitive receptors from toxic air contaminant emissions for Alternative 2 are short-term and minor, and; thus, less than significant and would not contribute to cumulatively significant impacts under the 1989 General Plan development trends. No odor-related impacts are anticipated. Concurrent and future projects in the NSCARP area would be required to mitigate construction and operational emissions to less than significant levels; therefore, cumulative impacts related to air quality emissions, contaminants, and odors would be less than significant with incorporation of mitigation on a per project basis.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1 through 5 (See Section 3.3 - CEQA Thresholds of Significance Criteria)

Mitigation Measures: None required

Cumulative Impacts – Biological Resources: The NSCARP could potentially contribute to cumulatively significant impacts to biological resources.

Discussion: The NSCARP project involves both the temporary disturbance and permanent loss of habitat, which would affect vegetation and wildlife, including special-status species and/or designated critical habitat which could be potentially adversely affected. Construction of the NSCARP would also result in the permanent loss of native upland woodland habitat. Furthermore, a variety of biological resource impacts related to hydrological systems could cause significant impacts. Overall, a variety of mitigation measures would be implemented by the SCWA and its contractors to minimize significant impacts, and would reduce project-specific impacts to a less than significant level.

Cumulative development allowable under the 1989 General Plan could potentially create significant impacts to biological resources. Adopted policies and objectives of the 1989 General Plan governing critical habitats, riparian corridors and other natural resources would reduce the impacts of habitat changes and new development on these species to the extent feasible.

In terms of impacts to wetlands, the project would result in the temporary disturbance of waters and wetlands regulated by the Corps under Section 404 of the Clean Water Act and/or the CDFG under Section 1600 of the California Fish and Game Code; however, over the long-term, impacts are considered cumulatively beneficial as ponds would be created and more instream flow preserved; however, because there remains a potential for continued loss of unknown populations of special-status species or loss of essential habitat for listed species as a result of activities that are not subject to County permit requirements, reasonable foreseeable trends and projections would create significant and potentially unavoidable impacts.

Although it is high likely that mitigation in the form of additional General Plan Open Space and Conservation Element policies from the Draft GP 2020 would address protection and management of biological resources, not all occurrences of special-status species are known and some land uses are not regulated. As such, there would be a significant and unavoidable impact to biological resources when taking into account the

NSCARP and foreseeable cumulative projects. Several mitigation measures would be implemented for NSCARP impacts (see Section 3.4); however, no additional mitigation is evaluated.

Impact Category: Significant and Unavoidable

CEQA Thresholds of Significance Criteria: 1 through 6 (See Section 3.4.3 – Significance Criteria)

Mitigation Measures: No mitigation measures available

Impact after Mitigation: Significant and Unavoidable. Due to the potential for continued loss of unknown populations of special-status species or loss of essential habitat for listed species, impacts to biological resources are considered significant and unavoidable.

Cumulative Impacts – Cultural Resources: The NSCARP could potentially contribute to cumulatively significant impacts to cultural resources.

Discussion: Implementation of the NSCARP could result in the potential disturbance of known prehistoric and historic sites and thus would be a potentially significant impact. Furthermore, implementation of NSCARP alternatives could result in the potential disturbance of undiscovered prehistoric sites, historical sites, paleontological resources, and isolated prehistoric and/or historic features or artifacts, and human remains. A variety of mitigation pertaining to specific sites that may be impacted would be utilized to lessen or avoid impacts.

A cumulative impacts analysis for cultural resources would include proposed, planned, reasonably foreseeable, and approved projects and development in the region. Developments and planned land uses within the region as part of 1989 General Plan development trends and projections and the Draft GP 2020 would contribute to potential conflicts with cultural and paleontological resources. These resources include archaeological resources associated with Native American activities and historic resources associated with settlement, farming, gold mining, viticulture, and economic development. Similarly, implementation of the NSCARP could impact undiscovered paleontological resources. To offset impacts related to cumulative projects, implementation of project-specific mitigation measures, and various relevant goals, objectives, and policies contained in the General Plan would be required.

Although continuation of reasonably foreseeable future development trends would increase the impacts to unknown cultural resources in the project area, implementation of similar mitigation measures on a project-by-project basis would serve to mitigate these impacts to the extent feasible. Cumulative development trends would not warrant a change beyond mitigations already recommended.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: See Section 3.5.7 CEQA Thresholds of Criteria

Mitigation Measures: None required

Cumulative Impacts – Environmental Justice: The NSCARP could potentially contribute to cumulatively significant impacts to environmental justice.

Discussion: Based on 2000 U.S. Census data, the block groups that encompass the project area have a minority (non-Caucasian) population of 19.5 percent. Sonoma County has a minority population (non-Caucasian) population of 18.4 percent. Though the project area contains a higher minority population, the project area does not have a minority population greater than 50 percent. Because construction and operation of the NSCARP would not result in disproportional significant adverse human health or environmental effects on minority persons, this impact is considered less than significant.

The SCWA and the Bureau of Reclamation have engaged stakeholders for input at all levels of the project decision-making process to ensure early, accessible, and meaningful participation. Through stakeholder participation, the agencies have included the public, agencies, and interested groups in the decision-making process and have explored opportunities to address environmental justice within the current statutory and regulatory structure. No disproportionately significant effects of project implementation, including adverse human health or environmental effects are expected to occur to minority or low-income populations. Cumulatively, NEPA projects potentially affecting the area's population would be subject to similar stakeholder processes and decision-making participation. This is considered a less than significant impact.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1 and 2 (See Section 3.6, Table 3.6-4)

Mitigation Measures: None required

Cumulative Impacts – Geology and Soils: The NSCARP could potentially contribute to cumulatively significant impacts to geology and soils.

Discussion: Appropriate design measures and engineering standards would mitigate most of the impacts pertaining to geologic and soils hazards. However, portions of the NSCARP pipelines would have to be sited across existing faults, which is unavoidable. Ground failure could potentially result in structural or mechanical damage to NSCARP facilities, as well as secondary effects associated with release of recycled water into a waterway. However, the quantity of water that may be released from a pipeline rupture would be limited by the closure of isolation valves on both sides within minutes of detected pressure drop.

As growth and other cumulative projects occur in the NSCARP area, there would be a cumulative development of facilities in the region in an area of high seismic risk. However, such impacts are site specific; therefore, placement of NSCARP facilities, in conjunction with continuing and future development trends, would not exacerbate the regional risks of geologic and soils hazards.

NSCARP components located in designated MRZ-2 areas could potentially contribute to development that would reduce the availability of mineral resources in the NSCARP area. Engineering considerations for the NSCARP and potential future projects of a similar scope may require construction of or siting of facilities in these areas; however Mitigation Measure GEO-5 would ensure that pipelines that would be sited to avoid MRZ-2 zones as much as feasible. Furthermore, jack-and-bore, HDD, and attachment to existing bridges, would not present a significant and permanent impact to MRZ-2 zones. Each site would only be affected by construction activity for one to two weeks. Cumulative development trends are highly unlikely to have a significant effect on these zones because of established planning policies governing these areas. Furthermore, no other projects similar to NSCARP that may affect MRZ-2 zones are reasonably foreseeable in the near future. Furthermore, given implementation of Mitigation Measure GEO-8 and the relatively short timeframe of impact, cumulative impacts would be less than significant.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1 through 9 (See Section 3.7, Table 3.7-4)

Mitigation Measures: None required

Cumulative Impacts – Hydrology/Water Quality: The NSCARP could potentially contribute to cumulatively significant impacts to hydrology/water quality.

Discussion: Construction of NSCARP components could result in increased erosion and subsequent sedimentation, and degradation of surface runoff quality, resulting in impacts to water quality in adjacent surface waters or drainages. Sedimentation in waterways could degrade water available for beneficial uses by increasing suspended sediment levels (turbidity), reducing the flood-carrying capacity, and adversely affecting associated aquatic and riparian habitats. Additionally, sedimentation to local drainage facilities could result in reduced storm flow capacities, resulting in localized ponding or flooding during storm events. Construction activities associated with excavation could result in the dewatering of shallow groundwater resources and contamination of surface water. The SCWA would comply with NPDES permit requirements imposed by the RWQCB for dewatering activities. On a cumulative analysis level, large-scale development projects consistent with the 1989 General Plan and reasonably foreseeable in the Draft GP 2020, the above impacts would create cumulatively significant but mitigable impacts given implementation of mitigations required through federal and state regulations.

Additionally, NSCARP would increase the amount of impervious surfaces that, in turn, would alter the drainage pattern or increase local storm runoff volumes that could exceed the capacity of onsite drainage systems. This could potentially cause localized flooding or contribute to a cumulatively significant flooding impact downstream. However, increases in impervious surface would be limited to above ground facilities, consisting of a total of 14 booster and distribution pump stations, and; thus, would be a minimal impact. Flooding impacts, as well as impacts to the structural integrity of reservoirs, would be mitigated through project design as specified in Section 3.8, Hydrology and Water Quality. Operational activities would not contribute to cumulatively significant impacts due to the minor permanent increase in impervious surfaces.

Implementation of the NSCARP has the potential to degrade groundwater quality and alter groundwater flows, and cause a variety of other impacts to groundwater and water quality. Potential impacts to groundwater and water quality would be mitigated to reduce impacts to a less than significant level. Furthermore, NSCARP would offset use of surface water supplies, which would increase summer flows in the tributaries of the Russian River. In addition, reduced agricultural diversions from the Russian River would help maintain storage levels in Lake Mendocino and Sonoma, resulting in more water being available that can be released in the fall to assist with Chinook salmon upstream migration.

NSCARP would result in fewer agricultural diversions from the Russian River and its tributaries, which would enable the SCWA to release less water from storage in Lake Mendocino and Sonoma to meet water demands and instream flow requirements. This would result in more water being conserved in storage in these reservoirs, which would provide more operational flexibility for the SCWA to benefit fisheries sources in the Russian River. The increased operational flexibility would not result in additional water being available for other uses because existing reservoir storage capacity, water rights, and flow requirements would not change.

Residential, commercial, industrial, and public uses consistent with the 1989 General Plan development trends and policies could introduce additional non-point source pollutants to downstream surface waters; however, existing federal, state, and local regulations, as well as General Plan policies and programs designed to protect water quality would reduce this to a less than significant impact. This also applies to erosion and sedimentation, which would occur during construction activities. Existing federal and state regulations, along with water quality policies and programs contained in the General Plan, would be applied on a per project bases and would reduce impacts to hydrology and water quality to a level of less than significant.

Land uses and development consistent with the adopted 1989 General Plan and reasonably foreseeable in the Draft GP 2020, would result in a gradual increase in impervious cover, especially in urban service areas; however, an increase in impervious surfaces or changes to drainage patterns would be minimal with implementation of the NSCARP.

Because the NSCARP would not place housing or other development within 100-year flood zones, implementation of the project would not add to cumulative impacts related to flooding. Dam failure is not expected to add to cumulatively significant flooding impacts either, as dams would be constructed per DSOD requirements. Thus, cumulative impacts from flooding and inundation would be less than significant.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1 through 11 (See Section 3.8.4 CEQA Thresholds of Significance

Mitigation Measures: None required

Cumulative Impacts – Land Use: The NSCARP could potentially contribute to cumulatively significant impacts to land use.

Discussion: The NSCARP facilities would be located in sparsely populated areas and not be located in or near urban areas. One exception is the unincorporated town of Geyserville, which would contain a portion of the pipeline route in the Northern Alexander subarea; however, the nature of this component would not create a division of land use or community separation. No housing is proposed. Thus, the proposed project would not contribute to a potentially significant cumulative impact on established communities.

NSCARP facilities would be located in sparsely populated areas and not be located in or near urban areas. One exception is the unincorporated town of Geyserville, which would contain a portion of the pipeline route in the Northern Alexander subarea; however, the nature of this component would not create a division of land use or separation of a community. Additionally, no housing is proposed. Thus, the proposed project would not contribute to a potentially significant cumulative impact on established communities.

Population growth rates are declining; however, ongoing development would create cumulatively significant growth-pattern impacts. Land use conflicts between urban and agricultural uses result when residential and other uses become the primary use of land adjacent to or surrounded by agricultural uses. Urban intrusion into agricultural lands could occur with continued implementation of growth and development trends under the 1989 General Plan and reasonable foreseeable with the Draft GP 2020. The conversion of undeveloped agricultural or open space lands to urban uses or changes resulting in incompatibilities of land use type, as a result of secondary growth effects, would result in significant and unavoidable impacts.

Because NSCARP would not resulting in growth-inducing effects (see Section 3.11 Population and Housing), cumulative land use impacts would not occur.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1 through 4 (See Section 3.9, Table 3.9-4)

Mitigation Measures: None required

Cumulative Impacts – Noise: The NSCARP could potentially contribute to cumulatively significant impacts from noise.

Discussion: Operational noise impacts as result of implementation of the NSCARP are considered less than significant with mitigation (e.g. pump stations). Furthermore, operation of reservoirs would not generate measurable noise levels as there would be no sources of noise resulting from the operation and maintenance of storage facilities that would cause a substantial increase in ambient noise levels. However, construction noise impacts although temporary in nature, would exceed County noise standards identified in the 1989 General Plan and create a significant impact. Mitigation Measure NOI-1 would reduce construction noise impacts to a less than significant level.

Construction noise, which is identified as a significant but mitigatible impact as discussed in Section 3.11, Noise, would be exacerbated by other concurrent construction projects occurring in the same area or by projects that occur soon after NSCARP construction activities are completed. Construction of major projects could potentially increase noise levels at specific sites or extend the length of time in which such sites would be exposed to high levels of noise, particularly with regards to construction traffic. During construction activities, cumulative impacts would be lessened to a degree through standard coordination of construction contracts in the NSCARP area. Mitigation measures have also been proposed for construction noise (see Section 3.11).

Noise from pump stations would not represent a significant contribution to the overall noise levels in the NSCARP area. As population in the area increases and more intensive land uses, particularly residential development, occur in the NSCARP area, the existing noise environment of some areas may permanently change. Standard noise attenuation would be included for the pump stations (see Section 3.11 - Noise), and there would be no cumulatively significant impact from operational noise.

In more rural, unincorporated areas, new stationary or mobile sources of noise, which are typically attributable to large-scale residential, commercial and/or industrial projects, are not anticipated. Furthermore, due to the less than significant operational noise impacts from NSCARP (with mitigation); there would be less than significant cumulative noise impacts as a result of implementation of the project and continuation of 1989 General Plan's development trends and policies.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1 through 5 (See Section 3.10, Table 3.10-6)

Mitigation Measures: None required

Cumulative Impacts – Population and Housing: The NSCARP could potentially contribute to cumulatively significant impacts to population and housing.

Discussion: Because the installation of recycled water pipelines, development of proposed and expanded reservoirs, and construction of pump stations would not result in the need for new home construction, and because the proposed extension of infrastructure would not be utilized to service new homes, project-specific impacts are considered less than significant. Furthermore, NSCARP would not require construction of new housing or displace any existing housing structures or people.

Adopted 1989 General Plan policies would allow population growth to continue to occur within the unincorporated portion of Sonoma County, although not substantially, by accommodating new housing and businesses, and by providing services and infrastructure capacity.

NSCARP would result in fewer agricultural diversions from the Russian River and its tributaries, which would enable the SCWA to release less water from storage in Lake Mendocino and Sonoma to meet water demands and instream flow requirements. This would result in more water being conserved in storage in these reservoirs, which would provide more operational flexibility for the SCWA to benefit fisheries sources in the Russian River. The increased operational flexibility would not result in additional water being available for other uses because existing reservoir storage capacity, water rights, and flow requirements would not change.

Though NSCARP would provide recycled water to be used in-lieu of potable water supplies, recycled water users who participate in NSCARP would not lose their existing water right, and their participation would not provide authorization for their existing water right to be used for other purposes or places of use not currently authorized. Therefore, NSCARP would not support additional population and housing because the proposed project would not result in increased flows in the Russian River and any water that remains in the tributaries as a result of this project would not be available for appropriation by someone else. As such, cumulative impacts would be considered less than significant.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1 through 3 (See Section 3.11, Table 3.11-1)

Mitigation Measures: None required

Cumulative Impacts – Public Health and Safety: The NSCARP could potentially contribute to cumulatively significant impacts to public health and safety.

Discussion: Public health and safety impacts pertaining to construction activities would generally be more susceptible to cumulatively significant impacts than operational activities. Impacts would be exacerbated by other construction projects occurring in the same area at the same time or projects that would occur soon after NSCARP construction activities. However, as evidenced by growth trends concentrated in more urbanized areas of the County as allowable under then 1989 General Plan, it is not likely that a significant number of major construction projects would be occurring simultaneously with NSCARP in the areas of pipeline, reservoir, and pump station construction. As such, hazardous materials or safety hazards are not anticipated to be cumulatively considerable. During construction activities, cumulative impacts would be lessened to a degree through standard coordination of construction contracts in the NSCARP area. Furthermore, individual projects that do occur in the NSCARP area would generally be subject to similar construction mitigation measures designed to reduce significant impacts to less than significant levels. This impact is considered less than significant.

Operation of NSCARP facilities would require the use of hazardous materials and may increase the risk of exposure to hazardous materials. NSCARP could also potentially cause an increase in the potential exposure of the public to disease vectors (i.e., mosquitoes). A number of mitigation measures would be implemented with regards to risk of exposure, hazardous materials, wildland and vector control. With implementation of these measures, project-specific impacts would be less than significant. Furthermore, Title 22 regulations would be followed. Other cumulative recycled water projects in the region would employ these practices and regulations as well; therefore, cumulative impacts to public health resulting from agricultural use of recycled water would be less than significant.

Land uses and development consistent with the 1989 General Plan would allow new agricultural, residential, commercial, and industrial uses. As a result, more hazardous materials would be transported, used, and disposed of within the County. New agricultural operations would have the most relevant cumulatively significant impact on public health and safety in the area in conjunction with the NSCARP. The operation of the NSCARP would serve existing agricultural uses and would not result in the substantial development of new agricultural areas. Cumulatively operational impacts on public health and safety would be less than significant.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: See Section 3.12.3 CEQA Thresholds of Significance Criteria

Mitigation Measures: None required

Cumulative Impacts – Recreation: The NSCARP could potentially contribute to cumulatively significant impacts to recreation.

Discussion: Cumulatively significant impacts to recreation could result from NSCARP construction activities plus other construction projects. This may include the temporary disruption of project area roadways, which are often used as bicycle routes, as well as sidewalks and recreational trails, potentially restricting recreational opportunities within the project area. As discussed in Chapter 2 and Section 3.14, Transportation/Traffic, a Traffic Control Plan would be prepared and implemented and other potentially concurrent projects would generally be offset by similar mitigation measures.

With continuation of development trends allowable under the 1989 General Plan, there would be an increased demand for park and recreation services and facilities. The purpose of NSCARP is to provide recycled water for irrigation of agriculture in compliance with federal and state regulations, including DHS requirements listed under Title 22. Provision of this recycled water would offset use of surface water supplies, which would increase summer flows in the tributaries of the Russian River. In addition, reduced agricultural diversions from the Russian River would help maintain storage levels in Lake Mendocino and Sonoma, resulting in more water being available that can be released in the fall to assist with Chinook salmon upstream migration. As such, NSCARP may benefit recreational opportunities by increasing the amount of water that can be released in the fall into the Russian River.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1, 2 (See Section 3.13, Table 3.13.2)

Mitigation Measures: None required

Cumulative Impacts – Transportation/Traffic: The NSCARP could potentially contribute to cumulatively significant impacts to transportation/traffic.

Discussion: Construction activities would result in increased truck and construction equipment traffic on project area roadways. Traffic-generating activities related to the construction of the pipelines would create the most substantial impact of the three NSCARP components and would consist of the daily arrival and departure of constructions workers, trucks hauling equipment and materials to the construction site, the hauling of excavated soils, and importing of new fill. The Traffic Control Plan, which serves as the primary mitigation of transportation/traffic impacts, would identify construction procedures that would limit lane closures and offset decreased LOS to the shortest duration practicable. The Traffic Control Plan would also provide for adequate emergency and business/residential access and construction parking. Additionally, project area roadways would be restored after construction, thereby reducing potential post-construction driving hazards. For the operational and maintenance aspect of the NSCARP, the additional traffic generated would be very minimal, approximately four vehicles per month. With implementation of the Traffic Control Plan, transportation/traffic impacts due to NSCARP would be less than significant.

Local roadways in the NSCARP area are generally rural in nature and operate at LOS A (see Section 3.14, Transportation). Cumulative impacts as a result of construction and operation of NSCARP in conjunction with land uses and development consistent with the 1989 General Plan would represent a less than significant cumulative impact, over the long term. This is because land use and development projections would not be sufficient enough to create unacceptable LOS on project-area roadways. Although portions of U.S. 101 may experience congestion and poor LOS with ongoing development trends, generally the northern limit of this effect in the County is the Town of Windsor.

Construction-related impacts could be potentially cumulatively significant if concurrent construction projects are not properly coordinated; therefore, as part of the Traffic Control Plan, the SCWA shall coordinate project construction activities when feasible as the need arises. Impacts are considered significant but mitigable.

Impact Category: Significant but Mitigable

CEQA Thresholds of Significance Criteria: 1 through 6 (See Section 3.14, Table 3.14-4)

Mitigation Measure CUM-1: Incorporate and implement the following measure from the Traffic Control Plan:

The SCWA shall communicate and coordinate project construction activities with other agencies in the NSCARP area, possibly including PG&E, Sonoma County Department of Transportation and Public Works, and Caltrans. Phasing of project construction shall be coordinated when feasible to minimize cumulative impacts. Furthermore, the SCWA shall coordinate, with any appropriate agency, traffic mitigation measures to minimize the cumulative effect of simultaneous construction activity in overlapping areas, including utility disruptions.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure CUM-1 would provide for project coordination to reduce potential impacts from overlapping traffic impacts to a less than significant level.

Cumulative Impacts – Utilities and Service Systems: The NSCARP could potentially contribute to cumulatively significant impacts to utilities and service systems.

Discussion: NSCARP would not directly treat wastewater and, therefore, would not exceed wastewater treatment requirements of the NCRWQCB. No additional wastewater treatment facilities would be required beyond those currently in place, and no expansion or construction of a new wastewater treatment facility would be required for implementation of the NSCARP. Due to the size and dispersed nature of the proposed pump stations, the existing drainage system is anticipated to adequately accommodate storm water runoff associated with increased impervious surfaces within the project area. Similarly, the NSCARP would not generate the need for a new solid waste facility. The project's impacts would be considered less than significant.

No major disruptions in service are anticipated during the development and installation of relocated or new replacement utilities; however, it is possible that short-term disruption of service could occur during interconnection of new facilities. Mitigation would be implemented by the SCWA to offset potentially significant impacts to services disruptions (see Mitigation Measure CUM-1).

Mitigation Measure CUM-2 would serve to mitigate potentially significant cumulative impacts resulting from simultaneous project construction commenced by other agencies in the NSCARP. After incorporation of mitigation, impacts to fire protection, emergency/police services and solid waste disposal during construction activity would be cumulatively less than significant in conjunction with any concurrent construction projects. The operation of the NSCARP would not place a cumulatively significant burden on these public services. Furthermore, development project impacts would be offset by adopted plans, policies and fee programs that would be applied to future projects on a case-by-case basis.

Impact Category: Significant but Mitigable

CEQA Thresholds of Significance Criteria: 1 through 5 (See Section 3.15, Table 3.15-2)

Cumulative Mitigation Measure CUM-2: Implement Mitigation Measure CUM-1.

Impact after Mitigation: Less than Significant. Implementation of Mitigation Measure CUM-2 would provide for project coordination to reduce the potential impacts from overlapping impacts from utilities disruptions to a less than significant level.

Alternative 3: Alexander Valley-Jordan Reservoir Subset

This alternative represents a scaled-down version of the Alexander Valley subarea by limiting storage reservoir development to only the Jordan A and Jordan C reservoirs. This alternative would serve a smaller service area commensurate with the amount of potential storage capacity at the two proposed reservoir sites and potential summer recycled water supplies available from the ALWSZ treatment plant. As such, potentially significant cumulative impacts would be similar to Alternative 2, but smaller in scale. Mitigation measures implemented for Alternative 2 to reduce significant cumulative impacts to a less than significant level would also be applied to Alternative 3.

NSCARP Alternative 3 would result in the estimated emissions presented in Tables 3.3-4 and 3.3-5 of Section 3.3, Air Quality. Project-specific considerations and cumulative impacts analysis are discussed in detail in Alternative 2, Cumulative Impacts – Air Quality. Potentially significant cumulative impacts would be similar to Alternative 2, but smaller in scale.

Alternative 4: Russian River-Westside Subset

This alternative represents a scaled-down version of the Russian River Valley subarea. It limits storage reservoir development to the Russel-Bucher, Bucher, and Becnel #2 reservoir sites and utilizes the existing Gallo Twin Valley Reservoir. This alternative involves serving a smaller service area than the Russian River Valley subarea commensurate with the potential storage capacity that has been identified in the hills west of Westside Road, and potential summer recycled water supplies available from the ALWSZ. As such, potentially significant cumulative impacts would be similar to Alternative 2, but smaller in scale. Mitigation measures implemented for Alternative 2 to reduce significant impacts to a less than significant level would also be applied to Alternative 4.

NSCARP Alternative 4 would result in the estimated emissions presented in Tables 3.3-4 and 3.3-5 of Section 3.3, Air Quality. Project-specific considerations and cumulative impacts analysis are discussed in detail in Alternative 2, Cumulative Impacts – Air Quality. Potentially significant cumulative impacts would be similar to Alternative 2, but smaller in scale.

Chapter 5
Growth-Related Effects

Chapter 5. Growth-Related Effects

5.1 GROWTH-RELATED EFFECTS

Section 15126(d) of the State CEQA Guidelines and Reclamation's NEPA handbook require that growth-inducing effects of a proposed action be addressed in an EIR and/or EIS. The State CEQA Guidelines state the following:

> Discuss ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects that would remove obstacles to population growth (a major expansion of a wastewater treatment plan might, for example, allow for more construction in service areas). Increases in the population may further tax existing community service facilities so consideration must be given to this impact. Also discuss the characteristics of some projects that may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any areas is necessarily beneficial, detrimental, or of little significance to the environment.

A Project EIR need not evaluate general growth within a community if that growth is not caused, in part, by the project being evaluated.

Section 1508.8(b) of the Council on Environmental Quality NEPA Regulations states that the definition of effects includes:

> Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Growth can be induced in a number of ways, including through the elimination of obstacles to growth or through the stimulation of economic activity within the region. A project's growth-related impacts are generally secondary impacts. For example, a project may cause an increase in an area's population, which can result in added strain to existing facilities and services. Depending upon the status of the existing facilities and services as well as the extent of growth added by the project, this increase in use may or may not have an adverse impacts.

Growth inducement can also be considered in light of planned versus unplanned growth. If growth is planned, the environmental impacts of that growth have already been considered by the local jurisdiction. Local land use plans provide for land use development patterns and growth policies that are intended to allow for the orderly expansion of urban development supported by adequate urban public services. A project that is in conflict with local land use plans or could induce growth that exceeds local plans, could create adverse environmental impacts and impacts on other public services that have not been previously considered.

General Plans adopted by a city or county identify the expected future populations of the region and the lands that will be allowed to be developed. These Plans set forth goals, objectives, and policies to guide decisions about future growth of local jurisdictions. The policies must, by law, take into account existing and projected economic and social conditions, as well as the desires of the community. Once a General Plan is adopted and the allowable growth patterns of an area are identified, then the expansion or update of the various infrastructure systems can be scheduled to maintain adequate services throughout the planning horizons of the General Plan.

5.1.1 Methodology and Assumptions

Evaluation of growth-inducing effects of the NSCARP is based on a qualitative analysis of the indirect effects that could result from delivery and use of the recycled water within the Alexander Valley, Dry Creek Valley, Northern Alexander Valley, and Russian River Valley subareas.

5.1.2 CEQA Thresholds of Significance

The evaluation of potential growth-inducing impacts addresses whether NSCARP would directly or indirectly:

1. Foster direct and/or indirect employment growth
2. Foster new housing
3. Remove obstacles to growth; or
4. Encourage or facilitate other activities that cause significant environmental effects.

5.1.3 Impact Analysis

The analysis evaluates the potential for growth-inducing effects to result from construction of the recycled water storage and distribution facilities and from use of recycled water supplies made available under NSCARP. The NSCARP is designed to provide both a beneficial use of recycled water for agricultural purposes and alternative source of disposal for local wastewater operators. NSCARP would also offset use of water that is currently diverted from the Russian River, its tributaries, and groundwater sources.

Impact GRO-1: Growth Related to Direct and Indirect Employment

> **Discussion**: The construction and operation of NSCARP itself would not affect the employment patterns in the area. NSCARP would employ approximately 50 workers throughout the construction period. It is anticipated that the majority of workers would come from the Sonoma County area. Outside contractors may also be used, who would commute from outside of the County and stay at existing local hotels during construction.

There is an adequate supply of hotels and motels in the project area that could be utilized by the out-of-town personnel.

Project operation and maintenance may require up to four additional employees. Because the project would result in an increase in employment during operation and maintenance of only four employees, the project may result in only an incremental increase in demand for new housing to support an increase of four additional employees.

Impact Category: Less than Significant

CEQA Thresholds of Significance Criteria: 1, 2

Mitigation Measures: None required

Impact GRO-2*:* Growth Related to New Housing

Discussion. The proposed project does not include the construction of new homes and; therefore, would not bring new residents to the area. The project is intended to provide recycled water to agricultural interests within the NSCARP project area.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 2

Mitigation Measures: None required

Impact GRO-3*:* Growth Related to Removing Obstacles to Growth (Provision of Additional Recycled Water)

Discussion. The key issue related to growth inducement for the proposed project is whether or to what extent recycled water provided by the project would have a reduced demand on potable water resources that will potentially make the resource available for other uses and, therefore, have indirect growth-inducing impacts. To understand this issue, it is first important to consider water supply within the project's service area. It is also important to consider water supply in the context of other growth-related constraints.

Water Supplies within Sonoma County

Potable, commercial, industrial and agricultural water supplies in Sonoma County are derived from a number of sources, including surface water, groundwater, and recycled water. Surface water sources are primarily used in the incorporated areas (cities) and are supplemented by groundwater. Residences in rural areas in the County tend to rely more on groundwater sources. Lake Mendocino and Lake Sonoma are the principal sources of potable surface water supplies in Sonoma County. The SCWA provides potable water to approximately 600,000 persons in Sonoma and Marin counties. The SCWA's water supplies are derived primarily from high capacity wells along the Russian River.

Water is delivered on a wholesale basis to the SCWA's primary water customers (cities of Santa Rosa, Rohnert Park, Petaluma, Cotati, and Sonoma, the North Marin and Valley of the Moon Water Districts, and the Town of Windsor). The SCWA also provides water via the transmission system to other customers, such as the Marin Municipal Water District, Forestville Water District and local water companies.

The City of Santa Rosa provides water to areas within its city limits and to some unincorporated users in the South Santa Rosa and Rincon Valley areas through water obtained from both the SCWA Russian River system and groundwater wells. The Town of Windsor provides water within Town limits and outside Town limits to part of the unincorporated airport area to the south. Water is obtained on a supplemental basis from a direct connection to the SCWA transmission system, but most of the Town's water is from wells adjacent to the Russian River and is considered to be diverted from the Russian River underflow pursuant to agreement with SCWA and reporting under SCWA water rights permits.

Many of the SCWA's water contractors supplement this supply with groundwater and surface water sources. As discussed in Section 1.3, current sources of water within the project area consist of the following:

- Natural stream flow in the Russian River, Dry Creek, and numerous smaller tributary streams;
- Natural runoff storage in Lake Mendocino and Lake Sonoma during the wet season and released in the dry season for rediversion at downstream points. Included in this source is water imported from the Eel River system by PG&E into the East Fork of the Russian River; and,
- Groundwater within the Russian River, Alexander, and Dry Creek valleys.

The contribution from each of these sources has not been quantified; however, these sources are presently utilized by various municipal, industrial, and agricultural users to meet their respective demands. The volume of recycled water that NSCARP must accommodate is based on the expected demands in the NSCARP area and not expected supplies available.

The total supply of recycled water that presently could be made available to NSCARP is approximately 7,234 af annually. This amount is based on 2004 influent and takes into consideration the existing commitments for the City, Town of Windsor and the ALWSZ. It is projected that by the year 2020, from population growth within their respective service areas, the City, Town of Windsor, and the ALWSZ will have approximately 8,500 af annually of additional recycled water that will require a disposal alternative.

The projected future available supply in the year 2020 from the City, Town, and ALWSZ could be approximately 20,135 af. It is projected that by the year 2020, the City of Santa Rosa's total production of recycled water will increase such that the amount of water that could be made available to NSCARP could be up to 18,208 af annually. This increase is due to projected growth, changes in land ownership, fallowing of lands, contract attrition, conversion of lands from pasture to vineyard, and discontinuance of water discharged for irrigation disposal on City-owned lands.

It is expected that in the year 2020, there will still be approximately 743 af annually available to NSCARP from the ALWSZ. This amount is based on about 324 af of uncommitted winter storage and 419 af of water that was previously recycled.

Approximately 1,184 af of treated wastewater from the Town could be made available for NSCARP in the year 2020. This could occur if the lands currently irrigated were converted from pasture to vineyard, thereby reducing the annual irrigation demand, and by storing approximately 700 af of water previously discharged to Mark West Creek during the winter months.

If irrigation contract attrition and conversion of pasture lands to vineyards are not taken into account, the total future supply available for NSCARP from the City, Town of Windsor and ALWSZ would be 17,048 af.

Because the cities of Cloverdale and Healdsburg and the Geyserville Sanitation Zone are presently treating water to a secondary level, no water is available for NSCARP at this time. The wastewater would need to meet tertiary level treatment standards to be conveyed through the Geysers Pipeline. Healdsburg is in the process of upgrading its treatment facility to tertiary standards and it is anticipated that Cloverdale will upgrade their treatment facilities sometime in the future. At that time, this provider could be considered as potential future sources of water for the project.

The County of Sonoma General Plan Projections

The Housing Element of the existing, adopted Sonoma County General Plan, amended in 2002 (Sonoma County, 2002) provides population and household projections for unincorporated Sonoma County and Sonoma County as shown in Table 5-1. The 1990, 2000, and 2020 projections are based on ABAG 2002 Projections, the 1990 U.S. Census counts of population and households, and permits issued by the Sonoma County Permit and Resource Management Department. Based on the existing County General Plan, as shown in Table 5-1, the unincorporated portion of the County represented about 38 percent of the total County population in 1990 and is projected to represent a similar level, 35 percent, of the total County population in 2010. The existing General Plan's 2010 population projection for Unincorporated Sonoma County of

187,500 is 16 percent higher than the ABAG 2005 projection of 161,700. The existing General Plan's 2010 population project for Sonoma County of 529,700 is four percent higher that the ABAG 2005 projection of 508,000.

Table 5-1. Sonoma County General Plan Projections

Plan	1990	2000	2010
Unincorporated Sonoma County			
Population	148,377	165,300	187,500
Households	62,285	66,442	N/A
Sonoma County			
Population	388,222	455,300	529,700
Households	161,062	180,415	N/A

Source: Sonoma County, 2002

The County of Sonoma published the Sonoma County General Plan 2020 Draft EIR in January 2006 (Sonoma County, 2006). Because the EIR has not been finalized and approved, the analysis in this Growth section does not rely on information from the General Plan EIR. However, it is useful to review the population projections being incorporated into the Draft General Plan update, as shown in Table 5-2. Based on the Association of Bay Area Governments (ABAG) 2002 Projections, the Draft General Plan 2020 projects a population of 147,600 in the unincorporated area by 2020[1] and a total county population of 546,030 by 2020.

Table 5-2. Existing General Plan, ABAG 2005, and Draft General Plan 2020 Population Projections

	Existing General Plan	ABA 2005	Draft General Plan 2020
2010 Projections			
Unincorporated Sonoma County	187,500	151,700	----
Sonoma County	529,700	508,000	----
2020 Projections			
Unincorporated Sonoma County	----	165,100	147,660
Sonoma County	----	534,100	546,030

Source: Sonoma County, 2002; ABAG 2005; Sonoma County 2006.

1 To estimate population projections through 2020 under the General Plan EIR, Sonoma County Permit Resource Management Department used ABAG's Projections 2002, but substituted more recent projections for cities, if available, based on the input of Sonoma County cities (Sonoma County, 2002).

The draft Sonoma County General Plan's 2020 population projection for Unincorporated Sonoma County of 147,600 is 21 percent lower than projected for 2010 under the existing General Plan (see Table 5-2). The draft General Plan's 2020 population projection for Sonoma County of 546,030 is two percent higher than the ABAG's 2005 projection of 534,100 and three percent lower than the existing General Plan projected for 2010. Growth in Unincorporated Sonoma County has not occurred as rapidly as previously projected under the Housing Element of the existing General Plan, amended in 2002. Growth in Sonoma County as projected in the General Plan 2020 is generally consistent with projections in the Housing Element of the existing General Plan.

Water Demand Projections

The surface water and groundwater supplies within the northern Sonoma County area are finite, but renewable. The SCWA has determined that the capacity of its water transmission system is constrained in meeting existing contract commitments for some contractors during summer months. Efforts to build additional collection and transmission facilities and secure additional Russian River diversions from Lake Sonoma have been initiated. If these efforts are not approved, the SCWA would be unable to meet future demands of SCWA water contractors.

The existing water supply (without NSCARP) is considered adequate for planned growth under the approved General Plans (City of Sonoma, 1995; Sonoma County, 1989). However, the water transmission system that provides water from SCWA currently operates near its capacity during peak summer demand periods.

NSCARP, when fully implemented, would have the ability to provide approximately 7,234 AFY of recycled water to agricultural users for irrigation within the NSCARP area. This supply would assist in meeting peak demands during summer months, when irrigation demands are highest. NSCARP would provide recycled water to be used in-lieu of potable water supplies.

The total supply of recycled water that presently could be made available to NSCARP is approximately 7,234 af annually. It is projected that by the year 2020, from population growth within their respective service areas, the City, the ALWSZ, and Town will have approximately 8,500 af annually of additional recycled water that will require a disposal alternative. The proposed project has been designed for storage and delivery of approximately 13,000 af of recycled water annually, consistent with the estimated total seasonal demand.

The purpose of NSCARP is to provide recycled water for irrigation of agriculture in compliance with federal and state regulations, including DHS requirements listed under Title 22. Provision of this recycled water would offset use of surface water supplies, which would increase summer flows in the tributaries of the Russian River. In addition, reduced agricultural diversions from the Russian River would help maintain storage levels in Lake Mendocino and Sonoma, resulting in more water being available that can be released in the fall to assist with Chinook salmon upstream migration.

NSCARP would result in fewer agricultural diversions from the Russian River and its tributaries, which would enable the SCWA to release less water from storage in Lake Mendocino and Sonoma to meet water demands and instream flow requirements. This would result in more water being conserved in storage in these reservoirs, which would provide more operational flexibility for the SCWA to benefit fisheries sources in the Russian River. The increased operational flexibility would not result in additional water being available for other uses because existing reservoir storage capacity, water rights, and flow requirements would not change.

Though NSCARP would provide recycled water to be used in-lieu of potable water supplies, recycled water users who participate in NSCARP would not lose their existing water right, and their participation would not provide authorization for their existing water right to be used for other purposes or places of use not currently authorized. Therefore, NSCARP would not result in growth-inducing effects because the proposed project would not result in increased flows in the Russian River and any water that remains in the tributaries as a result of this project would not be available for appropriation by someone else.

Impact Category: Less than Significant

CEQA Threshold of Significance Criterion: 4

Mitigation Measures: None required

Chapter 6
Impact Conclusions

Chapter 6. Impact Conclusions

6.1 SIGNIFICANT AND UNAVOIDABLE IMPACTS

Significant and unavoidable impacts associated with the project alternatives are listed below. Unavoidable impacts are those impacts that would result even when the mitigation measures incorporated into the project description and the mitigation measures described in each resource section of this EIR/EIS are implemented.

Alternative 2

Significant and unavoidable impacts under this alternative are:

- Permanent Loss of Status Farmland
- Permanent Loss of Lands under Williamson Act Contracts

Alternative 3

Significant and unavoidable impacts under this alternative are:

- Permanent Loss of Status Farmland
- Permanent Loss of Lands under Williamson Act Contracts

Alternative 4

Significant and unavoidable impacts under this alternative are:

- Permanent Loss of Status Farmland
- Permanent Loss of Lands under Williamson Act Contracts

6.2 LESS-THAN-SIGNIFICANT IMPACTS

Each resource section throughout this EIR/EIS identifies impacts found to be less than significant.

6.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Section 21100(b)(5) of the CEQA Guidelines requires a discussion of irreversible environmental changes that would occur as a result of project implementation. According to Section 15126.2(c) of the CEQA Guidelines, "…uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as a highway improvement that provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such consumption is justified."

The proposed project would result in the following irreversible environmental changes:

- The mobilization of equipment, supplies, and manpower at construction sites;
- Use of nonrenewable resources in the construction of the proposed facilities;
- The consumption of natural resources (i.e., petroleum or other non-renewable resource) in the course of long-term project operations and maintenance;
- Labor; and,
- Minor land conversion of open space, agricultural, and natural environments.

Land that would be irreversibly committed include agricultural lands; vineyards and orchards; annual grasslands used for grazing; oak woodlands; riparian habitats; and wetland areas. The loss of oak woodland, riparian habitat, wetland resources, and some agricultural lands could be mitigated by restoring habitats as part of the project. The conversion of some agricultural land to nonagricultural uses, and not mitigated, is considered an irreversible and irretrievable commitment of resources.

The project will create an additional demand for energy in the form of petroleum products, natural gas and electricity. However, petroleum resources are considered world-wide, national, and state-wide resources that are beyond the scope of local governmental agencies control. Solar, geothermal, and hydrologic sources of power are renewable. Additionally, the Uniform Building Code regulates construction of structures with regard to energy efficiency. Therefore, project impacts on energy resources are considered less than significant.

6.4 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

NEPA requires that the local short-term benefits of implementing any of the project alternatives compared to the maintenance and enhancement of long-term productivity (42 U.S.C. 4332; 40 C.F.R. 1502.16). NSCARP is intended to achieve several benefits that will be realized over many years. These long-term benefits include:

- Maintaining streamflows in the Russian River and its tributaries for fisheries;
- Reducing existing diversions from the Russian River and its tributaries, and reducing demand on groundwater supplies;
- Improving the reliability of the water supply for agricultural water users; and,
- Providing an environmentally responsible method of recycled water disposal.

6.5 MITIGATION MEASURES

Each issue area section of the EIR/EIS contains a description of mitigation measures that could be implemented to reduce identified impacts to less-than-significant levels. Please refer to Tables ES-1 and ES-2 for a list of all mitigation measures, including those for the preferred alternative (Alternative 2).

6.6 MITIGATION MONITORING AND REPORTING PLAN

Public Resources Code Section 21081.6 requires that a mitigation monitoring and reporting program (MMRP) be adopted to ensure compliance with project mitigation measures identified in an EIR or other conditions requiring monitoring. According to that section, "the reporting or monitoring program shall be designed to ensure compliance during project implementation." The MMRP is presented in Table 6-1. The table lists the significant impacts identified in the EIR/EIS, the corresponding mitigation measure(s), and the corresponding mitigation monitoring and reporting tasks. Impacts and mitigation measures are presented in the same order as they occurred in the EIR/EIS. The columns in the table project the following information:

- **Impact:** A description of the substantial or potentially substantial adverse change in the environment as a result of the project or program, as stated in the Draft EIR;
- **Mitigation Measure(s):** The action(s) that will be taken to reduce the impact to a less-than-significant level;
- **Monitoring Tasks:** This column outlines the appropriate steps to implement and verify compliance with the mitigation measure. The SCWA will assume responsibility for all monitoring and reporting actions; and,
- **Monitoring Schedule:** This column indicates the general schedule for conducting each monitoring task, either prior to construction, during construction, and/or after construction.

Table 6-1. Mitigation Monitoring and Reporting Program

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
Aesthetics					
AES-1. NSCARP potentially could have a substantial adverse effect on the visual character and scenic resources on the project area based on evaluation criteria 1 and 2.	**Mitigation Measure AES-1:** The SCWA shall minimize construction zones/staging areas to the extent feasible; Following construction activities, the SCWA shall restore disturbed areas by reestablishing exiting topography, including repaving roadways, replanting trees, and/or reseeding with a native seed mix typical of the immediate surrounding areas; The SCWA shall revegetate the berms around the reservoirs with native seed mixes to soften the visual effect of the reservoirs from adjacent roadways; and, SCWA shall use design elements to enhance visual integration of the booster and distribution pump stations with their surroundings. These proposed facilities shall be painted low-glare earth-tone colors that blend with their surrounding terrain; highly reflective building materials and/or finishes shall not be used in the designs for proposed facilities. Pumping stations shall be screened with vegetation as much as feasible. Where applicable, pump-station placement shall adhere to the 20-foot County setback requirement for those stations located along designated Scenic Corridors.	1. Include mitigation measures for site restoration in construction contract specifications. 2. Include design elements in construction contract specifications. 3. Monitor compliance with construction contract specifications and maintain a record of post-construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	X
AES-2. NSCARP would introduce new sources of light to the project area	**Mitigation Measure AES-2:** A. Light sources that are utilized during nighttime construction activities shall be shielded and directional so as to minimize light-spill. Thus, significant impacts from nighttime light and glare would be avoided; and, B. The exterior lighting installed around the storage reservoirs and distribution and booster pump stations shall be a minimum standard required to ensure safe visibility. Lighting also shall be shielded and directed downward to minimize impacts of light and glare.	1. Include design elements in construction contract specifications. 2. Monitor compliance with construction contract specifications and maintain a record of post-construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	X

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
Agricultural Resources					
AG-1. The NSCARP could result in loss of Farmland.	**Mitigation Measure AG-1:** The SCWA shall site project components to avoid status Farmland and lands subject to Williamson Act Contracts, to the extent feasible. If project components cannot feasibly be located outside of lands designated as status Farmland or lands subject to Williamson Act Contracts, landowners would be compensated for the fair market value of lands acquired and for any applicable Williamson Act contract cancellation fees. Table 3.2-5 shows lands within the project area that are under Williamson Act Contracts and would require modifications to existing lands (i.e., development or expansion of reservoirs, placement of underground pipeline, or pump station development). No additional mitigation has been identified that would serve to reduce the loss of status Farmland to a less than significant level and, therefore, the NSCARP would result in a significant and unavoidable impact associated with the permanent loss of status Farmland and lands subject to Williamson Act Contracts.	1. Include design elements in construction contract specifications. 2. Monitor compliance with construction contract specifications and maintain a record of post-construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	
AG-2. The NSCARP would have the potential to conflict with existing Williamson Act Contracts.	**Mitigation Measure AG-2:** Implement Mitigation Measure AG-1.	See AG-1	X	X	
AG-5. The NSCARP would have the potential to introduce glassy-winged sharpshooters (Homalodisca coagulata) to the project area.	**Mitigation Measure AG-5:** Plants acquired for landscaping and revegetation purposes shall be purchased from locally grown stock or from a nursery that has an approved monitoring program for the GWSS.	1. Include mitigation measures for site restoration in construction contract specifications. 2. Monitor compliance with construction contract specifications and maintain a record of post-construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
Air Quality					
AQ-1. Emissions of criteria pollutants based on mass emissions thresholds established by the BAAQMD and NSCAPCD.	**Mitigation Measure AQ-1:** A. The following measures have been incorporated into the project design to reduce construction related air quality impacts from fugitive dust emissions resulting from construction of Alternatives 2, 3, and 4 to a less than significant level: • Water all active construction areas at least twice daily; • All trucks transporting soil, sand, or other loose materials will be covered or will maintain at least two feet of freeboard; • Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites; • Sweep daily all paved access roads, parking areas, and staging areas at construction sites; • Sweep streets daily if visible soil material is carried on adjacent public streets; • Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more); • Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed sediment stockpiles; • Limit traffic speeds on unpaved roads to 15 mph; • Install sandbags or other erosion control measures to prevent silt runoff to public roadways; • Replant vegetation in disturbed areas as quickly as possible. • Install wheel washers for all existing trucks, or wash off the tires or tracks of all trucks and equipment leaving the site; and, • Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.	1. Include the dust control provisions of the BAAQMD in the construction contract specifications. 2. Monitor compliance with construction contract specifications and maintain a record of construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	B. The SCWA shall apply the following mitigation measures to help reduce emissions from construction equipment exhaust (e.g. NOx, ROG, CO): • Use alternatively fueled construction equipment where feasible; • Minimize idling time (e.g. 5-minute maximum); • Maintain properly tuned equipment; and, • Limit the house of operations of heavy duty equipment and/or the amount of equipment in use, to the extent feasible.				
Biology					
BIO-1. Construction of the NSCARP Alternatives would result in the temporary disturbance to vegetation and wildlife.	**Mitigation Measure BIO-1:** None required. However, following construction, SCWA shall revegetate all disturbed areas with an appropriate mix of grasses and other herbaceous plant species. This will provide replacement vegetative cover and will promote the reoccupation or periodic use of these areas for nesting, cover, and foraging for wildlife. All installed vegetation will be certified free of noxious weeds.	1. Include mitigation measures for site restoration in construction contract specifications. 2. Include design elements in construction contract specifications. 3. Monitor compliance with construction contract specifications and maintain a record of post-construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	X

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
BIO-2. Construction of the NSCARP Alternatives would result in the permanent loss of native upland woodland (non-riparian) habitat.	**Mitigation Measure BIO-2:** To minimize impacts to native trees as a result of project construction, the following measures will be implemented by the SCWA and its contractors: A. To the extent feasible, the SCWA shall, prior to final design, adjust alignment of pipelines, pump plants, and reservoirs to avoid and minimize the removal of native oak trees. Within proposed pipeline corridors, the construction zone is approximately 100 feet wide to accommodate alignment adjustments. Trees that are not within the construction zone, or for which removal is not necessary due to safety issues, shall be avoided; B. Prior to project construction, SCWA shall conduct a survey to identify trees within the construction area that will be removed for pipeline installation. All native trees greater than six inches in diameter at breast height (dbh), as measured 4.5 feet above grade, will be tallied, tagged, measured, and health and vigor evaluated. Mitigation will not be required for non-native trees, nor native trees less than six inches at dbh; C. All native trees to remain in place and located within 25 feet of ground disturbances shall be temporarily fenced by SCWA with orange plastic construction (exclusion) fencing prior to and throughout all construction activities. The exclusion fencing shall be installed six feet outside the canopy dripline of each protected tree or stand. The fencing is intended to prevent equipment operations in the proximity of protected trees that may compact soil, crush roots, or collide with the tree trunk and/or overhanging branches; D. No construction equipment shall be parked, stored, or operated within six feet of the dripline of any protected tree;	1. Include mitigation measures in the construction contract specifications. 2. Conduct site evaluations prior to construction to identify protected trees. Revise project design to avoid removal of protect trees, if feasible. 3. Monitor compliance with construction contract specifications by maintaining a record of construction oversight for administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance. 4. Monitor establishment and survivorship of planted trees for two years postconstruction by maintaining a record of site evaluations for the administrative record.	**X**	**X**	**X**

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	E. SCWA or its contractor shall prepare, prior to construction, and subsequently implement following construction, a Restoration and Revegetation Plan for the project. The Plan will detail site preparation, planting techniques, watering schedules, maintenance procedures, and success criteria for installed plantings. The Plan shall include a monitoring program and will require weekly inspection of the plantings for the first month, followed by monthly monitoring for the next three months; and then quarterly monitoring for the next 12 months unless success criteria are met earlier. After the first year, plantings will be monitored on an annual basis for a period of four years. Monitoring will continue until performance standards are met; F. At locations where on-site mitigation may be precluded due to restricted rights-of-way and other factors, some of the mitigation may be conducted off-site at a publicly owned park or facility, or as part of a regional habitat restoration/enhancement program.				
BIO-3. Construction of the NSCARP alternatives will result in the loss of protected oak trees.	**Mitigation Measure BIO-3:** To minimize impacts to native oaks trees as a result of project construction, the following measures will be implemented by the SCWA and its contractors: A. Implement Mitigation Measure BIO-2 ; and, B. Following construction, SCWA shall replace each valley oak tree removed and/or substantially damaged as a result of project construction in accordance with Section 26-67-0303 of the Sonoma County Zoning Code.	See BIO-2	**X**	**X**	**X**

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
BIO-4. Construction of the NSCARP alternatives could impact protected raptors and other bird species during nesting.	**Mitigation Measure BIO-4:** SCWA shall schedule tree removal and ground-clearing activities prior to the initiation of nesting activity (March) or after fledging (August). If this is infeasible, SCWA shall conduct pre-construction surveys between February 15 and August 15 in potential nesting habitat to identify nest sites. If an active raptor nest is observed within 350 feet of the project site, SCWA shall contact CDFG and establish an appropriate protective buffer around the nest tree and prohibit construction activities in the buffer zone until the young have fledged.	1. Include mitigation measures in the construction contract specifications. 2. Conduct site evaluation prior to ground disturbing activities to identify potential nesting habitat for birds. 3. Monitor compliance with construction contract specifications and maintain a record of construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	
BIO-5. Construction of the NSCARP alternatives would result in the loss or degradation of wetlands and other waters.	**Mitigation Measure BIO5:** SCWA shall implement the following measures to avoid, minimize, reduce and/or compensate for impacts to waters and wetlands: A. For pipeline crossings of channels, wetlands, and other regulatory waters, the SCWA shall use trenchless construction methods (e.g. jack-and-bore, horizontal direction drilling [HDD], or suspension on an existing bridge; B. Silty or turbid water produced from pipeline construction activities shall not be discharged directly into streams. Instead, any water impounded between the dams and/or underflow seepage into the work site will be pumped into an upland containment area where the water will be allowed to percolate into the soil and not mix with channel flows; C. SCWA shall secure applicable permits from CDFG, the Corps, and RWQCB before initiating construction in area requiring permits from these agencies;	1. Ensure appropriate permits are obtained and that permit conditions include these mitigation measures. 2. Include mitigation measures in the construction contract specifications. 3. Conduct site evaluations of proposed staging areas prior to construction. 4. Monitor compliance with construction contract specifications and maintain a record of construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	X

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	D. A compensatory mitigation ratio (replacement-to-loss) for the temporary and permanent impacts shall be a minimum of 1:1 to assure no net loss. Potential mitigation strategies include: 1) the purchase of mitigation credits at an approved Wetland Mitigation Bank; 2) contribution of in-lieu fees for a regionally approved riparian and/or wetland creation or restoration project; and, 3) development of compensatory mitigation wetlands and riparian areas at project sites. Compensatory mitigation shall be subject to the approval of the Corps, CDFG, and RWQCB, and consistent with standards pertaining to mitigation type, location, and replacement-to-loss ratios. E. Diversion channels shall be constructed prior to the placement of fill material into natural channels for reservoir construction to prevent unexpected flows from entering the reservoir; and, F. The diversion channels shall be constructed in upland areas and in a manner to allow the establishment of vegetation similar to that of the natural channel being replaced. This will partially offset a portion of the loss of natural channel vegetation from reservoir construction, and provide a site for compensatory mitigation				
BIO-6. Construction of the NSCARP alternatives could impact special-status species and/or adversely effect designated critical habitat.	**Mitigation Measure BIO-6:** SCWA shall implement the following impact minimization and avoidance measures to reduce or compensate for impacts to special-status species: A. Prior to construction, there will be consultation with USFWS, NOAA Fisheries, and CDFG under FESA and CESA to secure proper authorization in the event of an " incidental take" of a listed species is anticipated; B. A minimum of one year prior to construction activities, field surveys will be conducted at each project site to determine the presence of special-status species and/or suitable habitat. All surveys will be conducted in accordance with approved survey protocols; C. If surveys identify the presence of special-status species at a project site, the following will be implemented:	1. Consult with resource agencies prior to construction to identify additional required protective measures for identified special-status species. 2. Include mitigation measures in the construction contract specifications. 3. Conduct site evaluation prior to construction to identify sensitive riparian and aquatic habitats. Revise project design to avoid sensitive wetland and riparian areas, if feasible.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	a. If feasible, the construction area will be adjusted to avoid impacts to special-status species and habitat. The adjusted alignment will be within the project area, and will include appropriate buffers between the species' occurrence or habitat and the construction area; b. If adjustment of the construction area is not feasible, there will be consultation with USFWS, NOAA Fisheries, and CDFG to develop species-specific measures to minimize the effects of construction and operation of the NSCARP project. This may include: seasonal construction restrictions, such as during the active nesting or rearing season of protected birds and bats, respectively; erection of protective barriers; collection and relocation of individuals; site monitoring during construction; site restoration; and, implementation of construction practices that would avoid specific areas, such as horizontal directional drilling, suspension of pipelines on existing bridges, etc. c. If there is no feasible alternative to the disturbance to special-status species or habitat, SCWA will compensate for any loss of special-status species habitat through a combination of the following: • creation of replacement habitat • habitat preservation through Conservation Easement • acquisition of credits at an approved mitigation bank • in-lieu contribution to a regional habitat restoration fund, and/or • other compensatory measures that are deemed acceptable by the USFWS, NOAA Fisheries, and CDFG. D. Any project component that would jeopardize the continued existence of a listed species will be eliminated from consideration. E. The SCWA will prepare and implement Frac-out Plan as detailed in Section 2.4 in the event horizontal directional drilling is proposed for any river crossing.	1. Monitor compliance with construction contract specifications and maintain a record of construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.			

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
BIO-8. Construction of the recycled water reservoirs can potentially increase ecological risk to animal and plant populations exposed to endocrine disrupting compounds.	**Mitigation Measure BIO-8:** Because of the evolving research on the issue of EDCs and xenobiotics, SCWA will perform the following: • Monitor on-going research to stay abreast of the state-of-the-science concerning EDCs and xenobiotics; • Consult and coordinate with the Regional Water Quality Control Board, USEPA, and other regulatory agencies on developing standards and promulgating regulations; • Implement appropriate treatment technologies as required by regulatory agencies; and, • Formulate and implement adaptive management procedures to respond to changes in regulations. • Encourage public awareness of recent federal guidelines concerning the proper disposal of prescription drugs, such as take-back programs, disposing down toilet or sink only if so labeled, etc. (Office of National Drug Control Policy, 2007).	1. Include mitigation measures for site restoration in construction contract specifications. 2. Include design elements in construction contract specifications. 3. Monitor compliance with construction contract specifications and maintain a record of post-construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	X
Cultural Resources					
CUL-1. Implementation of Alternative 2 of the NSCARP could result in the potential disturbance of known prehistoric and historic sites.	**Mitigation Measure CUL-1:** A. Where feasible, the SCWA shall avoid prehistoric and historic sites. If the SCWA cannot avoid the site and impacts may occur, then SCWA shall implement Mitigation Measures CUL-1(B); B. Update the records for prehistoric sites CA-Son-622 and CA-Son-1929, including determining the boundaries of the sites. If site boundaries are found to extend into the project APE, the eligibility C. The sites for inclusion in the NRHP and the CRHR shall be determined by an archaeologist meeting the Secretary of Interior's Professional Qualifications Standards in prehistoric archaeology. If a site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery shall be implemented for the area of the site within the project APE.	1. Include mitigation measures and SCWA standard contract documents regarding the discovery of cultural resources in the construction contract specifications. 2. Monitor compliance with construction contract specifications and maintain a record of construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	**During Construction**	**After Construction**
	D. The eligibility of historic sites CA-2317H, P-49-2283, the J Wine Trash Dump, and bridges, 20C-0006, 20C-0106, and 20-0038 for inclusion in the NRHP and the CRHR shall be determined by an archaeologist and/or historian meeting the Secretary of Interior's Professional Qualifications Standards in historical archaeology and/or architectural history. If a site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery and/or other appropriate documentation (e.g., Historic American Building Survey reports and/or photographs) shall be implemented for a site or the area of a site within the project APE. In addition, project plans shall include design features, as feasible, for pipeline installation on any bridges that are determined eligible for inclusion in the NRHP or CRHR. E. Bridge 20C-0155, Wohler Bridge, is eligible for inclusion in the NRHP and the CRHR. If project plans require that pipeline be attached to the bridge, an architectural historian that meets the Secretary of Interior's Professional Qualifications Standards in architectural history shall prepare appropriate documentation (e.g., Historic American Building Survey reports and/or photographs) for the bridge. In addition, project plans shall include designs features, as feasible, for pipeline installation on the bridge.				
CUL-2. Implementation of Alternative 2 of the NSCARP could result in the potential disturbance of undiscovered prehistoric sites, historical sites, and isolated prehistoric and/or historic features or artifacts, and human remains.	**Mitigation Measure CUL-2:** A. Project contractors and their staff shall be informed of the potential to encounter cultural resources during project implementation and protocols to follow if cultural resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanisms (e.g., handouts). Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during installation of pipelines and construction of reservoirs, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will	See CUL-1	**X**	**X**	

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	coordinate any necessary investigation of the discovery with an appropriate specialist (e.g., archaeologist or architectural historian). SCWA shall consider mitigation recommendations presented by a qualified archeologist for any unanticipated discoveries. SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. B. Project contractors and their staff shall be informed of the potential to encounter human remains during project implementation and protocols to follow if human remains are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). If human remains are discovered, all work shall be suspended in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.				
CUL-3. Implementation of Alternative 2 of the NSCARP could result in the potential disturbance or destruction of undiscovered paleontological resources.	**Mitigation Measure CUL-3:** A. Project contractors and their staff shall be informed of the potential to encounter paleontological resources during project implementation and protocols to follow if paleontological resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). Should any potentially unique paleontological resources (fossils) be encountered during project activities, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, the SCWA will coordinate any necessary investigation of the discovery with a qualified paleontologist.	See CUL-1	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	B. SCWA shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. The SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures				
CUL-4. Implementation of Alternative 3 of the NSCARP could result in the potential disturbance of known historic sites.	**Mitigation Measure CUL-4:** The eligibility of historic site CA-2317H and the Jimtown Bridge, 20C-0006 for inclusion in the NRHP and the CRHR shall be determined by an archaeologist and/or historian meeting the Secretary of Interior's Professional Qualifications Standards in historical archaeology and/or architectural history. If a site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery and/or other appropriate documentation (e.g., Historic American Building Survey reports and/or photographs) shall be implemented for a site or the area of a site within the project APE. In addition, project plans shall include design features, as feasible, for pipeline installation on any bridges that are determined eligible for inclusion in the NRHP or CRHR.	See CUL-1	**X**	**X**	
CUL-5. Implementation of Alternative 3 of the NSCARP could result in the potential disturbance of undiscovered prehistoric sites, historical sites, and isolated prehistoric and/or historic features or artifacts, and human remains.	**Mitigation Measure CUL-5:** A. Project contractors and their staff shall be informed of the potential to encounter cultural resources during project implementation and protocols to follow if cultural resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanisms (e.g., handouts). Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during installation of pipelines and construction of reservoirs, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, the SCWA will coordinate any necessary investigation of the discovery with an appropriate specialist (e.g., archaeologist or architectural historian). SCWA shall implement any mitigation necessary for the protection of cultural resources.	See CUL-1	**X**	**X**	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	B. SCWA shall consider mitigation recommendations presented by a qualified archeologist for any unanticipated discoveries. SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. C. Project contractors and their staff shall be informed of the potential to encounter human remains during project implementation and protocols to follow if human remains are uncovered. This information may be presented to contractors and their staff through the use of “tail-gate” meetings or other mechanism (e.g., handouts). If human remains are discovered, all work shall be suspended in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California’s Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.				
CUL-6. Implementation of Alternative 3 of the NSCARP could result in the potential disturbance or destruction of undiscovered paleontological resources.	**Mitigation Measure CUL-6:** A. Project contractors and their staff shall be informed of the potential to encounter paleontological resources during project implementation and protocols to follow if paleontological resources are uncovered. This information may be presented to contractors and their staff through the use of “tail-gate” meetings or other mechanism (e.g., handouts). Should any potentially unique paleontological resources (fossils) be encountered during project activities, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with a qualified paleontologist. SCWA shall implement any mitigation necessary for the protection of paleontological resources.	See CUL-1	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	B. SCWA shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. SCWA shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.				
CUL-7. Implementation of Alternative 4 of the NSCARP could result in the potential disturbance of a known prehistoric site.	**Mitigation Measure CUL-7:** Update the record for prehistoric site CA-Son-1929, including determining the boundaries of the sites. If site boundaries are found to extend into the project APE the eligibility of the sites for inclusion in the NRHP and the CRHR shall be determined by an archaeologist meeting the Secretary of Interior's Professional Qualifications Standards in prehistoric archaeology. If the site is determined eligible for inclusion in the NRHP or CRHR, a program for data recovery shall be implemented for the area of the site within the project APE.	See CUL-1	X	X	
CUL-8. Implementation of Alternative 4 of the NSCARP could result in the potential disturbance of undiscovered prehistoric sites, historical sites, and isolated prehistoric and/or historic features or artifacts, and human remains	**Mitigation Measure CUL-8:** A. Project contractors and their staff shall be informed of the potential to encounter cultural resources during project implementation and protocols to follow if cultural resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanisms (e.g. handouts) Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during installation of pipelines and construction of reservoirs, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with an appropriate specialist (e.g., archaeologist or architectural historian). SCWA shall implement any mitigation necessary for the protection of cultural resources.	See CUL-1	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	B. SCWA shall consider mitigation recommendations presented by a qualified archeologist for any unanticipated discoveries. The County shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. C. Project contractors and their staff shall be informed of the potential to encounter human remains during project implementation and protocols to follow if human remains are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). If human remains are discovered, all work shall be suspended in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.				
CUL-9. Implementation of Alternative 4 of the NSCARP could result in the potential disturbance or destruction of undiscovered paleontological resources.	**Mitigation Measure CUL-9:** A. Project contractors and their staff shall be informed of the potential to encounter paleontogical resources during the project implementation and protocols to follow if paleontological resources are uncovered. This information may be presented to contractors and their staff through the use of "tail-gate" meetings or other mechanism (e.g., handouts). Should any potentially unique paleontological resources (fossils) be encountered during project activities, work shall be suspended in the area of the discovery and the SCWA shall be immediately notified. At that time, SCWA will coordinate any necessary investigation of the discovery with a qualified paleontologist. SCWA shall implement any mitigation necessary for the protection of paleontological resources.	See CUL-1	**X**	**X**	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	B. SCWA shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. The County shall implement a measure(s) that it deems feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures.				
Geology, Seismicity, and Soils					
GEO-1. The NSCARP project potentially could be located within an area of unstable slope conditions.	**Mitigation Measure GEO-1:** The following recommendation and mitigation measures shall be incorporated, under the direction of the SCWA, into the project design specifications to reduce unstable slope conditions per Geoservices' Geologic Feasibility Study. A. Where steep or unstable slopes are encountered, implementation of Best Management Practices (BMPs) and other standard engineering practices shall be used. These include the keying-in of engineered slopes, use of retaining walls, slope stability monitoring, and dewatering systems. Appropriate reservoir siting criteria would ensure that storage sites would avoid mapped landslide areas. Standard slope stabilization measures, as approved by the DSOD, shall be implemented to provide adequate dam and reservoir foundation; B. Per Geoservices' Geologic Feasibility Study, options to mitigate the impact of debris slides may include removal of the weathered, debris-slide prone surficial soil zone during reservoir grading; construction of debris catchment measures such as debris fences, a bench/perimeter road to catch debris; or debris basins; and,	1. Ensure pre-construction geo-technical investigations are conducted. Incorporate recommendations into project design specifications to avoid impacts due to unstable slope conditions. 2. Monitor compliance with mitiga-tion measures and document for administrative record.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	C. Consistent with General Plan Policy PS-1f, a geologic study report shall be prepared under direction of the SCWA for each reservoir site prior to construction. Each report shall describe the hazards and include mitigation measures to reduce risks to acceptable levels. The design specifications for each reservoir site shall provide an engineer's or geologist's certification that risks have been mitigated to an acceptable level. To assess whether large landslides are present in dam and reservoir areas beyond those already evaluated, Geoservices recommends further evaluation by performing subsurface exploration to determine if in-place bedrock is present as part of each geologic study report.				
GEO-2. NSCARP components may be subject to ground rupture due to location near a surface trace of an active fault as measured by location of facilities within an Alquist-Priolo Earthquake Fault Zone.	**Mitigation Measure GEO-1:** NSCARP facilities shall be sited as to avoid Alquist-Priolo buffer zones, as determined by the CGS, as much as feasible. Per Geoservices' conclusions, the feasibility of construction of DSOD jurisdictional-size dams in reservoir locations will require additional evaluation of surface fault rupture hazards, as proposed reservoirs located in the eastern portions of the Northern Alexander and Alexander Valley sub-areas would be located in close proximity to the Maacama Fault Line. A major earthquake would subject the proposed recycled water pipeline alignments to ground motion and under extreme conditions, could potentially cause material failure or piping connection failure leading to rupture and release of water; however, the pipeline and associated structures would be designed to accommodate site-specific ground motions greater than those anticipated for this region. Measures to be implemented would include: • Engineering designs, construction practices and materials such as flexible pipes, shall be implemented in a manner that would be resistant to damage from rupture; and, • Performing a limited number of backhoe test pits/trenches across the trace of faults, to observe the units offset by the fault rupture surface and to identify the youngest geologic units offset by the fault.	1. Ensure pre-construction geotechnical investigations are conducted. Incorporate recommendations into project design specifications to avoid impacts due to surface fault rupture hazards. 2. Monitor compliance with mitigation measures and document for administrative record.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
GEO-3. NSCARP components will be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake, as measured by geotechnical assessments or detailed mapping.	**Mitigation Measure GEO-3:** Prior to the approval of construction plans for the proposed project components, design-level geotechnical investigations, including collection of site specific subsurface data, shall be completed by a qualified geotechnical engineer. The geotechnical evaluations shall include identification of density profiles, estimation of approximate maximum shallow groundwater levels, and development of site-specific design criteria to mitigate potential risks.	1. Ensure pre-construction geo-technical investigations are conducted. Incorporate recom-mendations into project design specifications to avoid impacts due to liquefaction. 2. Monitor compliance with mitigation measures and document for administrative record.	X	X	
GEO-7. NSCARP components may be vulnerable to damage due to expansive or corrosive soils.	**Mitigation Measure GEO-7:** Under the direction of the SCWA, a qualified geotechnical engineer shall conduct site specific geotechnical investigations in the areas where pipelines and pumping stations would be sited prior to construction. The investigations shall identify appropriate engineering considerations as recommended by a certified engineering geologist or registered geotechnical engineer for planned facilities, including engineering considerations to mitigate the effects of expansive and corrosive soils. Recommendations made as a result of these investigations to protect pipelines and pumping stations from expansive and corrosive soils shall be incorporated into project design specifications.	1. Ensure pre-construction geo-technical investigations are conducted. Incorporate recom-mendations into project design specifications to avoid impacts due to expansive or corrosive soils. 2. Monitor compliance with mitigation measures and document for administrative record.	X	X	
GEO-8. NSCARP components may be an incompatible land use type in the MRZ-2 classification or designated quarry area.	**Mitigation Measure GEO-8:** The SCWA shall ensure proposed pipelines be sited so as to avoid MRZ-2 zones and achieve compatible land use as much as feasible. Recommendations for siting pipelines shall be incorporated into design specifications prior to construction.	1. Include design elements in construction contract specifica-tions.	X		

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
Hydrology and Water Quality					
HWQ-1. Construction of NSCARP could result in increased erosion and subsequent sedimentation, degradation of surface runoff quality, with impacts to water quality.	**Mitigation Measure HWQ-1:** The SCWA shall file a NOI prior to construction, direct the contractor to develop and implement a SWPPP, and file a Notice of Termination (NOT) at the end of construction. The SWPPP shall be maintained at the site for the entire duration of construction. The objectives of the SWPPP are to identify pollutant sources that may affect the quality of stormwater discharge and to implement BMPs to reduce pollutants in stormwater discharges. The SWPPP for this proposed action shall include the implementation, at a minimum, of the following elements: • Source identification; • Preparation of a site map; • Description of construction materials, practices, and equipment storage and maintenance; • List of pollutants likely to contact stormwater; • Estimate of the construction site area and percent impervious area; • Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in stormwater runoff, such as detention basins, straw bales, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes; • Proposed construction dewatering plans; • List of provisions to eliminate or reduce discharge of materials to stormwater; • Description of waste management practices; • Spill prevention and control measures; • Maintenance and training practices; and • Sampling and analysis strategy and sampling schedule for discharges from construction activities	1. Include development of the SWPPP in the construction contract specifications. 2. Monitor compliance with SWPPP and maintain a record of construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
HWQ-2. Construction activities associated with excavation could result in the dewatering of shallow groundwater resources and contamination of surface water.	**Mitigation Measure HWQ-2:** The SCWA shall comply with the following NPDES permit requirements imposed by the RWQCB for dewatering activities: • The NCRWQCB would require compliance with certain provisions in the permit, such as treatment of flows prior to discharge. As such, the SCWA shall discharge the groundwater generated during dewatering with authorization of and required permits from the NCRWQCB; and • The SCWA shall comply with applicable permit conditions associated with the treatment of groundwater prior to discharge.	1. Verify that SWCA or the contractor has obtained an NPDES permit, or waiver, from the RWQCB for discharge of groundwater. 2. Include mitigation measure and provisions of NPDES permit in construction contract specifications and require the contractor to demonstrate permit compliance. 3. Monitor construction activities to verify permit compliance is occurring. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	
HWQ-4. Operation of NSCARP has the potential to degrade groundwater quality and alter groundwater flows (discussion of potential public health and safety impacts are discussed in Section 3.12 “Public Health and Safety”).	**Mitigation Measure HWQ-4:** Following construction, the SCWA shall implement a groundwater monitoring program. If groundwater monitoring finds that levels have exceeded established MCLs at storage reservoirs, the SCWA shall investigate the integrity of the clay liner(s) to determine whether any repairs area necessary.	1. Implement a groundwater monitoring program as detailed in Mitigation Measure HWQ-4. Monitor reservoir operations to verify permit compliance is occurring. If noncompliance is noted, determine the required actions and the deadline for compliance.			X
HWQ-5. During the winter months, high seasonal groundwater could intercept the bottom of the proposed reservoirs and possibly rise to a depth above the bottom of the reservoir. The pressure of groundwater could compromise the structural integrity of the reservoirs.	**Mitigation Measure HWQ-5:** If determined necessary, the SCWA shall construct the reservoirs with clay liners, which should not be affected by high groundwater levels. Following construction, the SCWA shall regularly monitor the reservoirs to determine whether there is any adverse effect to the reservoir liners. If necessary, the SCWA shall make necessary repairs.	1. Include design elements in construction contract specifications. 2. Monitor compliance with mitigation measures and document for administrative record.	X		X

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
HWQ-6. NSCARP could expose people or property to risks related to flooding.	**Mitigation Measure HWQ-6:** A. The SCWA shall adhere to the standards set by the California Department of Water Resources Division of Safety of Dams in the design and construction of the dams and berms for the reservoirs. The Division of Safety of Dams believes that adherence to these design and construction standards greatly reduces the probability of dam failure and is protective of public safety (Head 1996); and, B. During operation, the SCWA shall visually inspect the reservoirs on a regular basis to ensure that the embankments, control structures, access roads, and monitoring instrumentation are maintained. SCWA shall remove, if found, any impediments from the spillways and other control structures as soon as they are observed.	1. Include design elements in construction contract specifications. 2. Monitor compliance with mitigation measures and document for administrative record.	X	X	X
HWQ-9. Operation of NSCARP could result in indirect/direct discharge or dam seepage that result in potential water quality impacts	**Mitigation Measure HWQ-9:** The SCWA shall incorporate the following standard engineering mitigation measures into the final design of the pipelines to minimize the effects of pipeline ruptures: • Flexible joints • Welded joints • Pressure sensors • Visual inspection	1. Include design elements in construction contract specifica-tions. 2. Monitor compliance with mitigation measures and docu-ment for administrative record.	X	X	X
Land Use					
LU-2. NSCARP has the potential to conflict with goals, objectives, and policies identified in the Sonoma County General Plan.	**Mitigation Measure LU-2:** Implement Mitigation Measure AG-1	See AG-1	X	X	
LU-4. NSCARP has the potential to introduce inappropriate uses in a Community Separator.	**Mitigation Measure LU-4:** Implement Mitigation Measure AES-1	See AES-1	X	X	X

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
NOI-1. Construction or operation of the NSCARP may generate noise levels in excess of standards established in the local general plan, noise ordinance, or applicable standards of other agencies.	**Mitigation Measure NOI-1:** A. The SCWA shall ensure that noise disturbances at sensitive receptors during construction activities are reduced, per the County of Sonoma's General Plan Noise Element standards and the State Office of Noise Control Construction Noise Limits, to the extent feasible. Measures may include: • Equipment with improved noise muffling shall be used, and manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators, shall be intact and operational; • Construction equipment shall require weekly inspection to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding, etc.); • Wherever possible, hydraulic tools shall be used instead of pneumatic impact tools; • Construction activities shall be limited to the hours between 7:00 a.m. and 7:00 p.m.; • Where feasible, heavy truck trips shall be routed over streets or roads that will cause the least noise disturbance to residences or businesses in the vicinity of the construction activity; • Where feasible, construction staging areas, maintenance yards, and other construction-oriented operations shall be located to limit potential impacts to sensitive receptors; and, • Significantly affected sensitive noise receptors shall be specifically identified and notified in advance to keep windows and doors closed during peak construction activity.	1. Include noise control mitigation measures in the construction contract specifications. 2. Monitor compliance with noise control measures and maintain a record of construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	**During Construction**	**After Construction**
Noise					
NOI-2. NSCARP construction activities may result in generation of excessive ground-borne vibration levels.	**Mitigation Measure NOI-2:** Construction contractors selected by the SCWA shall utilize techniques that minimize ground-borne vibration (e.g., locate equipment as far away from sensitive receptors as feasible and avoid operating multiple pieces of equipment simultaneously near sensitive receptors) to the greatest extent feasible. These measures shall be incorporated into project specifications prior to commencement of construction.	1. Include vibration control mitigation measure in the construction contract specifications. 2. Monitor compliance with vibration control measures and maintain a record of construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	**X**	**X**	
NOI-3. Operation of the NSCARP may cause a substantial permanent increase in ambient noise levels above existing noise levels in the project vicinity.	**Mitigation Measure NOI-3:** Implement Mitigation Measure NOI-1	See NOI-1	**X**	**X**	
NOI-4. NSCARP potentially will expose people to noise in the vicinity of a public or private airport	**Mitigation Measure NOI-4:** SCWA shall assure all construction workers at the airport will comply with hearing protection measures. This would reduce the potential for permanent hearing loss and reduce the potential impact to less than significant levels.	1. Monitor compliance with hearing protection measures and maintain a record of construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	**X**	**X**	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	**During Construction**	**After Construction**
Public Health and Safety					
PUB-1. NSCARP may potentially expose workers or the public to contaminated soils during excavation activities, causing an increase in the risk of exposure.	**Mitigation Measure PUB-1:** Prior to construction, the SCWA shall develop, and subsequently implement during construction, a Construction Management Program (CMP). Potential hazardous waste release sites would be identified prior to construction by performing an Initial Site Assessment as part of the CMP to identify hazardous waste release sites within 500 feet of pipeline and pump stations construction, as well as reservoir facilities. Identification and proper management of any contaminated groundwater encountered during construction would mitigate impacts to a less than significant level. The following measures may be included as part of the CMP: • In the vicinity of hazardous materials/waste release sites, construction activities related to the project that require excavation or exposure of soil or groundwater shall be monitored by the contractor for subsurface contamination. The SCWA shall notify responsible agencies if any hazardous materials/wastes are encountered. Monitoring shall include, at minimum, visual observation by personnel with appropriate hazardous materials training, including 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training; • In the vicinity of hazardous materials/waste release sites, groundwater brought to the surface as a result of construction dewatering shall be handled in a manner appropriate to the construction-related permits for dewatering. If contamination is suspected or noted during the construction phase, then the groundwater shall be containerized and analyzed for contamination by a laboratory, certified by the CalEPA Environmental Laboratory Accreditation Program (ELAP), using USEPA-approved analytical methods. Where contaminated groundwater is encountered, precautions shall be taken to assure that the installation of piping or other construction activities do not further disperse contamination; and,	1. Include mitigation measure in the construction contract specifications. 2. Monitor compliance with construction contract specifications and maintain a record of construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	• All potentially contaminated materials encountered during project construction activities shall be evaluated in the context of applicable local, state, and federal regulations and/or guidelines governing hazardous waste. All materials deemed to be hazardous shall be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines. Disposal sites for both remediated and non-remediated soils shall be identified prior to beginning construction. Management of these sites shall be documented in a Material Management Plan acceptable to applicable agencies. All evaluation, remediation, treatment and/or disposal of hazardous waste shall be supervised and documented by qualified hazardous waste personnel.				
PUB-2. NSCARP could result in an accidental upset of hazardous materials used during construction that increases the risk of exposure to the environment, workers, and the public.	**Mitigation Measure PUB-2:** A. Consistent with the SWPPP requirements identified in Section 3.8 Hydrology and Water Quality, SCWA shall require the contractor to implement Best Management Practices (BMPs) for handling hazardous materials onsite. The use of construction BMPs will minimize adverse effects on groundwater and soils, and will include, without limitation, the following: • Follow manufacturers' recommendations and regulatory requirements for use, storage, and disposal of chemical products and hazardous materials used in construction; • Avoid overtopping construction equipment fuel gas tanks; • During routine maintenance of construction equipment, properly contain and remove grease and oils; and • Properly dispose of discarded containers of fuels and other chemicals. B. SCWA shall follow the provisions of California Code of Regulations, Title 8, Sections 5163 through 5167 for General Industry Safety Orders to protect the project area from being contaminated by the accidental release of any hazardous materials and/or wastes. Disposal of all hazardous materials will be in compliance with applicable	1 Include mitigation measures in the construction contract specifications. 2. Verify the contractor has developed a SWPPP that includes BMPs for handling hazardous materials. 3. Verify the contractor has developed a Site Safety Plan and has implemented a Safety Program that includes an injury and illness Prevention Program. 4. Monitor compliance with construction contract specifica-tions and maintain a record of construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	California hazardous waste disposal laws. SCWA will contact the local fire agency and the County Department of Public Health, Environmental Health Division, for any site-specific requirements regarding hazardous materials or hazardous waste containment or handling; C. In the event of an accidental release of hazardous materials during construction, containment and clean up shall occur in accordance with applicable regulatory requirements; D. Oil and other solvents used during maintenance of construction equipment shall be recycled or disposed of in accordance with applicable regulatory requirements. All hazardous materials shall be transported, handled, and disposed of in accordance with applicable regulatory requirements. E. If hazardous materials are encountered during construction activities, the contractor will be required to halt construction immediately and notify the SCWA Construction Compliance Section. Disposal of all hazardous materials will be in compliance with all applicable California hazardous waste disposal laws. F. Prepare and implement a Safety Program to ensure the health and safety of construction workers and the public during project construction. The Safety Program will include an injury and illness prevention program, a site-specific Safety Plan, and information on the appropriate personal protective equipment to be used during construction.				
PUB-3. Operation of NSCARP facilities would require the use of hazardous materials and may increase the risk of exposure to hazardous materials.	**Mitigation Measure PUB-3:** Implement Mitigation Measure PUB-2(B)	See PUB-2	**X**	**X**	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
PUB-5. Construction activities in grassland areas would have the potential to expose people or equipment to risk or loss, injury, or death involving wildland fires.	**Mitigation Measure PUB-5:** A. Prior to construction, the SCWA shall work closely with local fire agencies to develop a fire safety plan that describes various potential scenarios and actions to be implemented in the event of a fire; B. During construction, all staging areas, welding areas, or areas slated for construction using spark-producing equipment shall be cleared of dried vegetation or other material that could ignite. Any construction equipment that includes a spark arrestor shall be equipped with a spark arrestor in good working condition. During the construction of the project, SCWA shall require all work vehicles and construction crews to have access to functional fire extinguishers at all times.	1. Develop fire safety plan for inclusion in the construction contract Specifications 2. Monitor compliance with construction contract specifications and maintain a record of construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	
PUB-6. NSCARP could potentially cause an increase in the exposure of the public to disease vectors (i.e., mosquitoes).	**Mitigation Measure PUB-6:** The SCWA shall, where feasible, design NSCARP facilities in a manner that minimizes favorable conditions for the development of potential mosquito habitat as described in the DHS and the Marin/Sonoma Mosquito Abatement District's Criteria for Mosquito Prevention in Wastewater Reclamation or Disposal Projects. The criteria identify three general principles of mosquito control: (1) the manipulation of the physical features of the impoundment, (2) biological control, and (3) chemical control. Specific measures could potentially include: • Water bodies shall have an access ramp constructed on an inside slope for launching a small boat to conduct midge sampling and control; • A maintenance program for weeds and erosion control on the inner slopes of the water body; • Biological controls shall be used, such as stocking the reservoir with mosquito fish (*Gambusia affinis*); and, • Irrigation sites shall not have water ponding deeper than one inch for a period greater than four days during the breeding season.	1. Include mitigation measure in the construction contract specifications.	X		X

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
PUB-7. NSCARP would result in the use of recycled water for agricultural irrigation. The recycled water applied to the irrigated lands could possibly affect public health.	**Mitigation Measure PUB-7:** A. The SCWA shall require that a Recycled Water User Agreement (RWUA), an agreement between SCWA and each water user, be developed prior to the water user receiving recycled water. The RWUA shall include provisions that require recycled water to be applied compatible with good farming practices on land, consistent with runoff, ponding, and environmental restrictions (complying with Title 22 requirements) such as prohibit the over-application of recycled water (and subsequent ponding or surface runoff). Continued implementation of these measures would ensure that Title 22 requirements are met, that surface waters are protected, and that potential impacts to groundwater levels and water quality would be minimized, thus, ensuring no impact to public health. The SCWA shall be responsible for periodic monitoring of each NSCARP water user's practices to ensure that their ongoing use of the recycled water is consistent with Title 22 requirements and the RWUA. B. Implement Mitigation Measure HWQ-4.	1. Include mitigation measure in the construction contract specifications. 2. Monitor compliance with construction contract specifications and maintain a record of construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	
PUB-10. NSCARP recycled water may contain unregulated compounds, such as EDCs, which could affect public health.	**Mitigation Measure PUB-10:** Because of the evolving research on the issue of EDCs and xenobiotics, SCWA will perform the following: • Monitor on-going research to stay abreast of the state-of-the-science concerning EDCs and Xenobiotics; • Consult and coordinate with the RWQCB, USEPA, and other regulatory agencies on developing standards and promulgating regulations; • Implement appropriate treatment technologies, as required by regulatory agencies; and, • Formulate and implement adaptive management procedures to respond to changes in regulations.	1. Include mitigation measure in the construction contract specifications. 2. Monitor compliance with construction contract specifications and maintain a record of construction oversight for the administrative record. If noncompliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
Transportation/Traffic					
TRA-1. NSCARP potentially would cause an increase in local traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).	**Mitigation Measure TRA-1:** A. The SCWA shall adopt and implement a Traffic Control Plan prior to commencing project construction, which will include measures for reducing construction-related impacts to traffic and accessibility within the project area. The Traffic Control Plan shall include, but not be limited to, the following measures: • Coordinate with the affected residents, businesses and agencies regarding construction hours of operation and lane closures; • Follow guidelines of the local jurisdiction for road closures caused by construction activities; • Coordinate with the Sonoma County Transit System and the applicable school districts on construction hours of operation, lane closures, and temporary bus route delays; • Encourage construction contractors to carpool to and from work sites to reduce overall number of worker-vehicle trips; • Limit lane closures during peak commuting hours to the extent possible; • Install traffic control devices as specified in the Caltrans' Manual of Traffic Controls for Construction and Maintenance Works Zones; • Provide public notification of road closures and detour routing for all vehicle detours and lane shifts in the immediate vicinity of the open trenches in the construction zone; • Provide access to driveways and private roads outside the immediate construction zone; • Develop a business notification plan for access to local business in and adjacent to the construction zone; • Provide notification to the public of temporary closures of sidewalks, bicycle lanes, and recreation trails; and,	1. Verify that SWCA obtains appropriate local road encroachment permits. 2. Include mitigation measures for traffic, including development of a Traffic Control Plan, in the construction contract specifica-tions. 3. Monitor implementation of and compliance with encroachment permits, the Traffic Control Plan, and other traffic and transportation mitigation measures and maintain a record of construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	• Consult with emergency service providers and develop an emergency access plan for emergency vehicles access in and adjacent to the construction zone. B. The SCWA shall obtain and comply with local road encroachment permits for roads that are affected by construction activities prior to any construction activity within public roads and rights-of-way.				
TRA-4. NSCARP construction potentially could result in significant traffic delays resulting in inadequate emergency access.	**Mitigation Measure TRA-4:** Implement Mitigation Measure TRA-1	See TRA-1	**X**	**X**	
TRA-5. NSCARP potentially could result in inadequate parking capacity (especially during construction activities) or inadequate business/residence access.	**Mitigation Measure TRA-5:** Implement Mitigation Measure TRA-1	See TRA-1	**X**	**X**	
TRA-6. NSCARP potentially could conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).	**Mitigation Measure TRA-6:** Implement Mitigation Measure TRA-1	See TRA-1	**X**	**X**	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
Utilities and Service Systems					
UTIL-5. NSCARP potentially could result in un-repaired damage or an extended disruption in service provided by a utility.	**Mitigation Measure UTIL-1:** A. The SCWA shall identify utilities along the affected portions of the NSCARP prior to construction. For locations with adverse impacts, the following mitigations shall be implemented: • Utility locations shall be verified through the use of the Underground Service Alert services and/or field survey (potholing); • As necessary, detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and fill of areas around utility cables and pipes. All affected utility services shall be notified of construction plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services; • In areas where the pipeline would parallel underground utility lines within five feet, the SCWA shall employ special construction techniques. These special measures, which shall be included in the engineering specifications, shall include trench wall-support measures to guard against trench wall failure and possible resulting loss of structural support for the excavated areas; and, • Residents and businesses in the project corridor shall be notified of any planned utility service disruption two to four days in advance, in conformance with county and state standards. • In conjunction with Mitigation Measure UTL-1, the following measures shall be implemented: • Disconnected cables and lines shall be reconnected promptly;	1. Include mitigation measure in the construction contract specifications. 2. Monitor implementation of and compliance with mitigation measure and maintain a record of construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	X	X	

Table 6-1. (Continued)

Environmental Impact	Mitigation Measures	Implementation, Monitoring, and Reporting Tasks	Monitoring Tasks		
			Before Construction	During Construction	After Construction
	• The SCWA shall observe DHS standards which require (1) a 4-foot horizontal separation between parallel disinfected tertiary recycled water lines and water mains (gravity or force mains); and (2) 1-foot vertical separation between perpendicular water and disinfected tertiary recycled water line crossings (water line above recycled water line). In the event that separation requirements can not be maintained, the SCWA shall obtain DHS variance; and, • The SCWA shall coordinate final construction plans and specifications with affected utilities.				
Cumulative Impacts					
TRA. The NSCARP could potentially contribute to cumulatively significant impacts to transportation/ traffic.	**Mitigation Measure CUM-1:** Incorporate and implement the following measure from the Traffic Control Plan: The SCWA shall communicate and coordinate project construction activities with other agencies in the NSCARP area, possibly including PG&E, Sonoma County Department of Transportation and Public Works, and Caltrans. Phasing of project construction shall be coordinated when feasible to minimize cumulative impacts. Furthermore, the SCWA shall coordinate, with any appropriate agency, traffic mitigation measures to minimize the cumulative effect of simultaneous construction activity in overlapping areas, including utility disruptions.	1. Include mitigation measure in the construction contract specifications. 2. Monitor implementation of and compliance with mitigation measure and maintain a record of construction oversight for the administrative record. If non-compliance is noted, notify the construction contractor of required actions and the deadline for compliance.	**X**	**X**	
UTIL. The NSCARP could potentially contribute to cumulatively significant impacts to utilities and service systems.	**Mitigation Measure CUM-2:** Implement Mitigation Measure CUM-1	See CUM-1	**X**	**X**	

Chapter 7

Consultation and Coordination

Chapter 7. Consultation and Coordination

7.1 PUBLIC AND AGENCY INVOLVEMENT

SCWA and Reclamation have solicited public input on the project through public hearings, public workshops, and scoping meetings.

During the project development process, a series of meetings was held to solicit community input concerning the project. In 1997, SCWA conducted a Recycled Water Workshop to evaluate the feasibility of a Sonoma County Recycled Water Distribution System. Conceptual layouts of pipeline routes and storage reservoir sites were presented as well as the benefits of expanded use of recycled water in Sonoma County. The workshop identified several north Sonoma County areas, including the Alexander Valley, Russian River Valley, and Dry Creek Valley as potential recipients of recycled water for agricultural use.

The SCWA held three informational pre-scoping meetings for early public input and outreach outside the official CEQA/NEPA process. The meetings were held: (1) February 3, 2004 at Alexander Community Hall; (2) February 4, 2004 at Warm Springs Dam Visitor Center; and, (3) February 5, 2004 at Westside School.

7.2 NOTICE OF PREPARATION/NOTICE OF INTENT

An NOP was filed with the State Clearinghouse (SCH# 2006012130) on January 27, 2006 pursuant to CEQA. In addition, the NOP was filed with the Sonoma County Clerk's Office, federal agencies, state agencies, local agencies, and interested persons. Appendix A contains a copy of the transmittal report from the State Clearinghouse, a copy of the NOP with a date-received stamped by the County Clerk's Office, and the NOP distribution lists. SCWA published a public notice (see Appendix A) of the availability of the NOP and of the Scoping Meeting (see Section 1.2) as follows:

- Press Democrat – February 11, 12, and 13, 2006
- Healdsburg Tribune – February 9 and February 16, 2006.
- Windsor Times – February 16, 2006.
- SCWA's website.

Reclamation published a NOI and Notice of Public Scoping Meetings in the Federal Register on January 31, 2006 (see Appendix A) pursuant to NEPA. Reclamation also published a notice of the Scoping Meeting on January 31, 2006 (71 FR 5069). See Appendix A.

7.3 SCOPING MEETINGS

Section 15083 of the State CEQA Guidelines authorizes and encourages an early consultation or scoping process to help identify the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR, and to help resolve concerns of affected agencies and individuals. In addition, the U.S. Council on Environmental Quality NEPA Regulations (40 CFR Section 1501.7) require “an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.”

Approximately 2,700 notices of the NOP and the scoping meeting were sent to residents in the Sonoma County region. SCWA held a CEQA Scoping Meeting at the Alexander Valley Community Hall on Thursday, February 16, 2006. The meeting was held to provide an overview of the proposed project and solicit input from interested individuals concerning the scope of the environmental analyses as outlined in the project NOP. The Scoping Meeting used an Open House format where SCWA staff was available to answer questions and provide information about NSCARP. Thirty-nine members of the public signed the sign-in sheet (see Appendix B). Following the open house, SCWA staff gave an overview presentation and summarized the environmental review process, including a discussion of the EIR/EIS being prepared for NSCARP, and the distribution of the NOP and NOI. Included in Appendix B is a copy of the transcripts for the two presentations, as well as questions and comments from the public. Comments were received from the following individuals during the scoping process:

- Mark Delaphaine – California Coastal Commission
- Timothy Sable – Caltrans
- Greg Scoles – City of Santa Rosa
- Richard Burtt Swift – Town of Windsor
- Brian J. Johnson – Trout Unlimited
- A. Crawford Cooley – Oat Valley Vineyards, LLC
- Sean Swift – The Bishop’s Ranch
- Fred Corson – Dry Creek Valley Association
- Douglas Lipton, Ph.D. – Lipton Environmental Group
- Lee Tolbert – Palomino Lakes Mutual Water Company (Letter #1)
- Lee Tolbert – Palomino Lakes Mutual Water Company (Letter #2)
- Brenda Adelman – Russian River Watershed Protection Committee
- Ronald Kaiser and Pamela Kaiser – Westside Farms
- Harry Black
- Clancy Burns
- Ridgely Evers
- Harold Hahn
- Bernadette Scarinzi
- Tom Todd
- Thomas A. Wilson
- Ralph Bright

- Charles Abbe
- Seas Swift
- Tom Neville
- Pete Lescure
- Allan Nelson
- Dennis Murphy
- Richard Rued
- Carolyn Draper Swift
- Dwight Monson

7.4 CONSULTATION REQUIREMENTS

7.4.1 Federal Endangered Species Act

Section 3.4 Biological Resources describe the potential for species listed or proposed for listing and other special-status species to occur in areas affected by the alternatives. Potential measures designed to avoid, minimize, or mitigate impacts to listed species are also detailed in Section 3.4 Biological Resources. A Biological Assessment of the effects of the proposed action to listed and proposed species would be prepared. If the proposed action may affect listed or proposed species, Reclamation will consult with the USFWS and or NOAA Fisheries under Section 7(a)(2) of the ESA.

7.4.2 Fish and Wildlife Coordination Act

This act requires federal agencies to provide equal consideration of fish and wildlife resources in the planning of and proposals for water resource development projects. This EIR/EIS is intended to serve as the basis for compliance with the Fish and Wildlife Coordination Act.

7.4.3 National Historic Preservation Act

Section 3.5 Cultural Resources describes the potential effects of project alternatives on cultural resources and identifies measures to avoid or reduce impacts on cultural resources. The Section 106 process will commence following completion of the final EIR/EIS.

7.4.4 Farmland Protection Policy

Memoranda from the U.S. Council on Environmental Quality to heads of agencies data August 30, 1976 and August 11, 1980, and the Farmlands Protection Policy Act of 1981 require federal agencies to include farmlands assessments in their EISs designed to minimize adverse impacts on prime and unique farmlands.

As described in Section 3.2 Agricultural Resources, the project alternatives would cause permanent loss of farmland in the NSCARP area. The environmental analysis of the alternatives includes a thorough discussion of impacts on prime, statewide important, and unique farmlands. The SCWA will consult with the Natural Resources Conservation Service on the effects of the project.

7.4.5 Executive Order 11988 (Floodplain Management)

Executive Order 11988 requires federal agencies to prepare floodplain assessments for proposed projects located in or affecting floodplains. An agency proposing to conduct an action within a floodplain must consider alternatives to avoid adverse affects and incompatible development in the floodplain. If the only practicable alterative involves siting in a floodplain, the agency must minimize potential harm to or development within the floodplain and explain why the action is proposed within the floodplain.

The proposed NSCARP facilities would not be located in floodplains. Construction of pipelines would occur across creeks, streams, and rivers; however, construction would be temporary and the stream channels would be restored to their original condition immediately following construction. No effects from these facilities are anticipated. Construction of the operational and capacity storage reservoirs would change the reservoir site locations to open water (storage sites). The reservoirs and pump stations would not be located in floodplains.

7.4.6 Executive Order 11990 (Protection of Wetlands)

Executive Order 11990 requires federal agencies to prepare wetland assessments for proposed projects located in or affecting wetlands. Agencies must avoid undertaking new construction in wetlands unless no practicable alternative is available and the proposed action includes all practicable measures to minimize harm to wetlands.

The project alternatives would result in direct impacts on wetlands. All NSCARP alternatives were evaluated for their impact on wetlands and other resources. The mitigation measures specified for the project alternatives require avoidance, replacement, and enhancement measures that would replace all wetland acreage and habitat values affected. For a detailed discussion of the project alternatives' impacts on wetlands, see Section 3.4 Biological Resources.

7.4.7 Executive Order 12898 (Environmental Justice)

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-income Populations," requires each federal agency to identify and address disproportionately high and adverse human health or environmental effects of their actions on minorities and low-income populations and communities. Reclamation policy requires that NEPA documents include a determination of whether a project will have any adverse impacts on minority or low-income populations.

To comply with Reclamation direction for the environmental justice assessment, demographic data were analyzed at a geographic scale commensurate with the NSCARP impact area. The results of this analysis are included in Section 3.6 Environmental Justice.

7.4.8 Clean Water Act

The Federal Clean Water Act requires a permit to be obtained from the Corps for the discharge of dredged or fill materials to waters of the United States, including adjacent wetlands. The Corps reviews applications for Section 404 permits in accordance with guidelines for Section 404 of the Clean Water Act. The Corps must also determine that the project is not contrary to the public interest (33 CFR 323.6). NSCARP will involve the placement of fill material into waters of the United States and wetlands. These impacts are detailed in Section 3.4 Biological Resources, along with proposed measures to mitigate impacts.

7.4.9 Indian Trust Assets

The U.S. Department of the Interior is responsible for ensuring that its actions do not negatively affect assets held in trust by the United States for Native Americans. Reclamation's Indian Trust Asset Coordinator has confirmed that no Indian Trust Assets are located within the NSCARP area or would be affected by the NSCARP alternatives under consideration. Section 3.5 Cultural Resources describes consultation to date with the Native American community.

7.4.10 Executive Order 13112 (Invasive Species)

Executive Order 13112 directs federal agencies to expand and coordinate their efforts to combat the introduction and spread of plants and animals not native to the United States. The EO prohibits federal agencies from authorizing, funding, or implementing actions that are likely to cause or promote the introduction or spread of invasive species unless all reasonable measures to minimize risk of harm have been analyzed and considered. The impact of invasive species are detailed in Section 3.4 Biological Resources, along with proposed measures to mitigate impacts.

Invasive species are reducing the economic productivity and ecological integrity of our nation's lands and waters. The rate of introduction of such species has risen markedly in recent years with costs to society growing commensurately. Invasive species harm noninvasive native species and their habitats, renewable resources, and diminish productive capacity of agricultural lands including forestlands, rangelands, and pasturelands. They may negatively impact a wide variety of human activities and needs. The threat to ecosystem health in the United States is particularly acute because there are more relatively intact ecosystems in the continuous U.S. than in most temperate countries (Natural Resource Conservation Service, 2005).

The EO established the National Invasive Species Council (NISC) and Invasive Species Advisory Committee (ISAC) to implement the EO The NISC and ISAC developed a National Invasive Species Management Plan (NISMP) to focus upon terrestrial and aquatic invasive plants, animals, and microbial organisms that cause or may cause significant negative impacts and do not provide an equivalent benefit to society. Until adoption of a national list of invasive plants is prepared by the NISC, the appropriate state list of official noxious weeds should be used.

Toward that end, the *Pest Ratings of Noxious Weed Species and Noxious Weed Seed* list prepared by the California Department of Food and Agriculture (CDFA, 2004) and the *California Invasive Plant Inventory* (California Invasive Plant Council [Cal-IPC], 2006) were reviewed. CDFA has three rating lists for noxious weeds. List A is the highest level of noxious weed. Plants should be eradicated, contained, rejected or other holding action at the state and county level. List B are plants that should be eradicated, contained, controlled, or other holding action at the discretion of the County Agricultural Commissioner. List C plants are for state-endorsed holding action and eradication only when found in a nursery, action to retard spread outside of nurseries is at the discretion of the commissioner; and plants rejected only when found in a cropseed for planting or at the discretion of the commissioner. The Cal-IPC has four listing categories: Table 1 are invasive non-native plants that threaten wildlands in California; Table 2 are species native to a part of California, but invasive in other parts of the state; Table 3 are species evaluated but not listed; and, Table 4 are species nominated but not reviewed.

In addition, staff at the Marin/Sonoma Weed Management Area were contacted to determine specific noxious weed species for the NSCARP project area, and appropriate measures to avoid or minimize impacts (L. Thomassin, pers. comm., 2006). Specific weeds of local concern include purple star-thistle, Italian thistle, French broom, Scotch broom, medusahead, cape ivy, pampas grass, barbed goatgrass, ice plant, and others.

Table 1 in Attachment 4 of Appendix F lists the category of noxious weeds identified during field surveys for the NSCARP project. No CDFA List A species were found, but a number of List B and List C species were observed. These included Italian thistle, yellow star-thistle, field bindweed, French broom, Himalayan blackberry, medusa-head, and others.

7.5 CONSULTATION AND NOTIFICATION LIST

During preparation of the EIR/EIS, resource agencies and interest groups were notified and consulted with regarding the proposed project. As indicated above, SCWA and Reclamation have provided materials to an extensive list of interested agencies and individuals.

The following entities will receive a copy of the Draft EIR/EIS. SCWA will also mail notices to an existing 2,700-person mailing list, informing these parties of where the document is available locally for their review and where they may request an individual copy. The current mailing list include property owners and other interested parties.

7.5.1. Sonoma County

- Agricultural Commissioner
- Board of Supervisors
- County Counsel
- Emergency Services
- Health Services
- Permit and Resource Management
- Regional Parks

7.5.2 Cities/Counties and Other Agencies

- Alexander Valley School
- City of Cloverdale
- City of Cotati
- City of Healdsburg
- City of Santa Rosa
- Geyserville Fire Department
- North Coast Railroad Authority
- North Sonoma County Air Pollution Control District
- Town of Windsor

7.5.3 State Agencies

- Air Resources Board
- California Native American Heritage Commission
- Department of Conservation
- Department of Fish and Game
- Department of Forestry and Fire Protection
- Department of Health Services
- Department of Parks and Recreation
- Department of Toxic Substances Control
- Department of Transportation
- Department of Water Resources
- Environmental Protection Agency – External Affairs
- North Coast Regional Water Quality Control Board
- Office of Drinking Water
- Office of Planning and Research
- Resources Agency
- State Lands Commission
- State Office of Historic Preservation
- State Water Resources Control Board

7.5.4 Federal Agencies

- Army Corps of Engineers – District Engineer
- Army Corps of Engineers – Regulatory Branch
- Bureau of Land Management
- Bureau of Reclamation – Mid-Pacific Region
- Bureau of Reclamation – Regional Director
- Department of Agriculture Soil Conservation Services
- Department of the Interior – Office of Water & Science
- Environmental Protection Agency – Oceans & Estuaries
- Environmental Protection Agency – Office of Water
- Environmental Protection Agency – Regional IX

- Environmental Protection Agency – San Francisco Estuary project
- Fish and Wildlife – Sacramento
- National Oceanographic and Atmospheric Administration

7.5.5 Representatives

- California State Assembly – Patty Berg
- California State Assembly – Joe Nation
- California State Assembly – Noreen Evans
- California State Senate – Wesley Chesbro
- California State Senate – Carole Migden
- U.S. House of Representatives – Mike Thompson
- U.S. House of Representatives – Lynn Woolsey

7.5.6 Other Interested Groups

- Audubon Society – Madrone Chapter
- Bishops Ranch
- Bodega Bay Alliance for Sustainable Community
- Bodega Bay Concerned Citizens
- Bodega Harbor Homeowners Association
- Bodega Marine Laboratory
- California Native Plant Society
- California Resource Strategies
- Community Clean Water Institute
- Dry Creek Valley Association
- Environmental Center of Sonoma County
- Forest Unlimited
- Friends of the Esteros
- Friends of the Russian River
- Russian River Valley Winegrowers
- Russian River Watershed Council
- Russian River Watershed Protection
- Salmon Creek Watershed Council
- Sea DMO
- Sierra Club
- Sonoma Coast Villa
- Sonoma County Alliance
- Sonoma County Farm Bureau
- Sonoma County Wineries Association
- Sonoma Land Trust
- Sonoma Valley Visitors Bureau
- Surfrider Foundation, Sonoma County Chapter
- Trout Unlimited
- University of California, Davis/Bodega Marine Lab

Chapter 8
References

Chapter 8. References

1.0 PURPOSE OF AND NEED FOR NSCARP

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Chapter 9
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Chapter 10
Acronyms

Chapter 10. Acronyms

af	acre feet
ALWSZ	Airport/Larkfield/Wikiup Sanitation Zone
APN	Assessor's Parcel Number
AWWA	American Water Works Association
BAAQMD	Bay Area Air Quality Management District
bgs	Below ground surface
BMP	Best Management Practices
CalOSHA	California Occupational Safety and Health Administration
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CFR	Code of Federal Regulations
CSA	Coalition for Sustainable Agriculture
cu. yds.	cubic yards
CUP-E	Consumptive Use Program-English Version
cy	cubic yards
CDFG	California Department of Fish & Game
CDHS	California Department of Health Services
DCAWU	Dry Creek Agricultural Water Users Corporation
dia.	diameter
DOSD	California Division of Safety of Dams
DWR	California Department of Water Resources
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
ESA	Endangered Species Act
ET	crop evapotranspiration
ETo	reference evapotranspiration
FEMA	Federal Emergency Management Agency
fps	feet per second
fps	feet per second
ft	feet

gph	gallons per hour
gpm	gallons per minute
H:V	slope (horizontal vs. vertical)
HGL	hydraulic grade line
hp	horsepower
ID	identification
in	inches
IRWP	Incremental Recycled Water Program
JVW	Jordan Vineyard & Winery
Kc	crop factor
km	kilometers
l.f.	linear feet
MGD	million gallons per day
MSE	maximum storage elevation
MSL	maximum storage level
NCRWQCB	North Coast Regional Water Quality Control Board
NEPA	National Environmental Policy Act
NOAA	National Oceanic & Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NSAPCD	North Sonoma Air Pollution Control District
NSCARP	North Sonoma County Agricultural Reuse Project
OSHA	U.S. Occupational Safety and Health Administration
P.E.	Professional Engineer
PM_{10}	particulate matter 10 microns or less in diameter
PRMD	Planning & Resource Management Department
psi	pounds per square inch
PVC	polyvinyl chloride
Reclamation	United States Bureau of Reclamation
REG	Registered Engineering Geologist
RWQCB	Regional Water Quality Control Board
SCWA	Sonoma County Water Agency
sq. ft.	square feet
SWPPP	Storm Water Pollution Prevention Plan

SWRCB	State Water Resources Control Board, Division of Water Rights
SZ	Sanitation Zone
TDH	total dynamic head
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
UV	ultraviolet
WBE	Wagner & Bonsignore, Consulting Civil Engineers
WRIMS	Water Rights Information Management System
WWTF	Wastewater Treatment Facility

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