Draft
Environmental Impact Statement/ Environmental Impact Report for the Nimbus Hatchery Fish Passage Project

Rancho Cordova, California

U.S. Department of the Interior
Bureau of Reclamation

California Department of Fish and Game

October 2010

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Prepared by

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Bureau of Reclamation
Mid-Pacific Regional Office
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California Department
of Fish and Game

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Nimbus Hatchery Fish Passage Project
Draft Environmental Impact Statement/Environmental Impact Report

(State Clearinghouse No. 2009042050)

NEPA Lead Agency: United States Department of the Interior, Bureau of Reclamation

CEQA Lead Agency: California Department of Fish and Game

The United States Department of the Interior, Bureau of Reclamation (Reclamation) and the California Department of Fish and Game (CDFG) are have jointly prepared this Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Nimbus Hatchery Fish Passage Project (Project).

The Nimbus Fish Hatchery (Hatchery) is located along the lower American River, ¼ mile downstream from Nimbus Dam in Gold River, CA. Reclamation built the Hatchery in 1955 to mitigate for the loss of spawning habitat for Chinook salmon and steelhead trout by the construction of Nimbus Dam, and CDFG operates and maintains the Hatchery. The existing fish weir, which helps adult salmon enter the fish ladder, is aging, is susceptible to damage from high flows, and is requiring annual flow reductions for maintenance.

Reclamation has identified two alternatives that would address this issue. Alternative 1 is to extend the fish ladder from the Hatchery to the Nimbus Dam stilling basin, using the basin itself to hold and divert fish into the ladder. With the first alternative, the existing weir would be permanently removed. Two implementation options for Alternative 1—Alternative 1A and Alternative 1C—are being evaluated because the CDFG is considering modifying fishing closure regulations. Alternative 1A is consistent with Fish and Game Code and would not require that fishing regulations be modified. Alternative 1C requires a modification of fishing regulations to be approved by the Fish and Game Commission. Alternative 2 is to replace the existing weir with a new weir structure.

The draft EIS/EIR evaluates the potential impacts of implementing these alternatives and a no-action alternative on various resources, including: fisheries, biological resources, recreational resources, cultural resources, geology and soils, water resources, hazardous materials, public health and safety, infrastructure (including utilities and transportation), energy, air quality, noise, land use, visual resources, and socioeconomics and environmental justice.

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ACRYONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
ADA	Americans with Disabilities Act
AIRFA	American Indian Religious Freedom Act
APCD	Air Pollution Control District
APE	area of potential effects
ARPA	Archaeological Resources Protection Act
BMP	best management practice
BP	before present
CAA	Clean Air Act
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDPR	California Department of Parks and Recreation
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHP	California Highway Patrol
CIWMC	California Interagency Watershed Mapping Committee
CNDBB	California Natural Diversity Database
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CSUS	California State University, Sacramento
CVPIA	Central Valley Project Improvement Act
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel scale
dBC	C-weighted decibel scale
DERA	Department of Environmental Review and Assessment (City of Sacramento)
DPM	diesel particulate matter
DTSC	(California) Department of Toxic Substances Control
DWR	Department of Water Resources
EA	environmental assessment
EFH	essential fish habitat
EIS/EIR	environmental impact statement/environmental impact report
EO	executive order
EPA	US Environmental Protection Agency

ACRYONYMS AND ABBREVIATIONS *(continued)*

ESA	Endangered Species Act
ESU	evolutionary significant unit
FICUN	Federal Interagency Committee on Urban Noise
FR	Federal Register
FWCA	Fish and Wildlife Coordination Act
GHG	greenhouse gas
GSWC	Golden State Water Company
GWh	gigawatt-hours
Hz	Hertz
ITA	Indian Trust Asset
kV	kilovolt
L50	noise level exceeded 50 percent of the time
Ldn	day-night average sound level
Leq	equivalent noise levels
MBTA	Migratory Bird Treaty Act
mg/l	milligrams per liter
ml/L	milliliters per liter
msl	mean sea level
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Quality Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	notice of availability
NOC	notice of completion
NOD	notice of determination
NOI	notice of intent
NOP	notice of preparation
Nox	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRHP	National Register of Historic Places
NSR	new source review
NTU	nephelometric turbidity unit
OEHHA	(California) Office of Environmental Health Hazard Assessment
OHWM	ordinary high water mark

OU	operable unit
PASS	Project Alternatives Solutions Study
PG&E	Pacific Gas and Electric Company
PL	Public Law
$PM_{2.5}$	fine particulate matter
PM_{10}	inhalable particulate matter
PPV	peak particle velocity
PSD	prevention of significant deterioration
ROD	record of decision
ROG	reactive organic compounds
RM	river mile
RPA	reasonable and prudent alternative
SACOG	Sacramento Area Council of Governments
SCSD	Sacramento County Sheriff's Department
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMUD	Sacramento Municipal Utility District
SOx	sulfur oxides
SPCC plan	spill prevention control and countermeasures plan
SRA	State Recreation Area
SWP	State Water Project
SWRCB	State Water Resources Control Board
SWPPP	stormwater pollution prevention plan
TMDL	total maximum daily load
TPH-d	total petroleum hydrocarbons as diesel
UAIC	United Auburn Indian Community of the Auburn Rancheria
USACE	US Army Corps of Engineers
USC	United States Code
USCG	US Coast Guard
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
UST	underground storage tank
VMT	vehicle miles traveled
VOC	volatile organic compound
WAPA	Western Area Power Administration

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Executive Summary

Introduction

The United States Department of the Interior, Bureau of Reclamation (Reclamation), and the California Department of Fish and Game (CDFG) have prepared this environmental impact statement/environmental impact report (EIS/EIR) to address the environmental effects of the proposed removal or replacement of a fish diversion weir (weir) at the Nimbus Fish Hatchery (Hatchery) in Rancho Cordova, Sacramento County, California. These agencies have prepared this EIS/EIR in accordance with the National Environmental Policy Act (NEPA) of 1969, 42 United States Code (USC) Section 4321 et seq., the Council on Environmental Quality (CEQ) regulations for implementing NEPA, 40 Code of Federal Regulations (CFR), Parts 1500-1508, the California Environmental Quality Act (CEQA) of 1970, California Public Resources Code, Section 21000 et seq., as amended, the Guidelines for Implementation of CEQA, Title 14, California Code of Regulations (CCR), Section 15000 et seq., and Reclamation and CDFG guidelines. Reclamation is the NEPA lead agency and the CDFG is the CEQA lead agency.

Background and Setting

The Hatchery is on the lower American River, approximately a quarter-mile downstream of Nimbus Dam. The Hatchery was built as mitigation for chinook salmon (*Oncorhynchus tshawytscha*) and Central Valley steelhead trout (*O. mykiss*; “steelhead”) spawning areas blocked by the construction of Nimbus Dam. The weir was constructed to create a barrier in the river that allows adult chinook salmon to locate the entrance to the fish ladder for collection by the Hatchery. The weir is needed from mid-September through early January during the chinook salmon spawning season. The weir superstructure is removed for the remainder of the year, although its foundation and concrete piers remain in place year-round. Without the weir superstructure in place to block upstream passage of chinook salmon, sufficient numbers to meet Hatchery mitigation production goals could not enter the ladder. Steelhead locate the ladder entrance in sufficient numbers to meet mitigation production goals without the weir superstructure in place.

The Hatchery, weir, and fish ladder were constructed and became operational in 1955. Since then, much of the hatchery infrastructure has been modernized, but the weir and ladder system are largely unchanged. The weir structure is aging and shows signs of over 50 years of use. The weir foundation and piers are periodically damaged by significant winter river flows, requiring major repairs in 1963, 1982, 1986, and 1999. There are also operational and maintenance problems with the weir that could jeopardize adult fish collection and the Hatchery's ability to meet its mitigation obligations. Installation and maintenance of the weir require lowering river flows to levels that negatively affect steelhead, a protected species under the Endangered Species Act (ESA) and California Endangered Species Act (CESA). The weir design cannot handle flows over 5,000 cubic feet per second (cfs) and sometimes requires removal before sufficient numbers of adult fall-run chinook salmon can be collected. Worker safety during installation and removal and for routine cleaning is also a primary concern.

The most recent flood to significantly damage the weir foundation and river embankment next to the Hatchery occurred in January 1997. Reclamation consulted with the NMFS on potential impacts of the repair project, including continued weir repair and associated flow reductions on federally protected fish. The NMFS recommended that ". . . Reclamation and CDFG develop a long-term solution and a schedule for implementation to minimize flow fluctuations associated with the installation and removal of the Nimbus Fish Hatchery fish diversion weir racks and pickets by June 2000" (NMFS 1999).

Purpose and Need

The purpose of the proposed project is to create and maintain a reliable system for collecting adult fish to allow Reclamation to remain in compliance with mitigation obligations for spawning areas blocked by the construction of Nimbus Dam, while adequately protecting chinook salmon and Central Valley steelhead trout. Reclamation is authorized to replace the weir or to implement its functional equivalent in order to fulfill its obligation to raise four million chinook salmon smolts and 430,000 steelhead yearlings annually at the Hatchery. This obligation was established as a result of the Fish and Wildlife Coordination Act Report (August 14, 1946, 60 Stat. 1080; United States Fish and Wildlife Service [USFWS] and CDFG 1953), which recommended measures to mitigate the impacts of constructing Nimbus Dam, as authorized by the American River Basin Development Act (October 14, 1949, 63 Stat. 852).

The proposed project would support Reclamation's need to address problems with the weir that could jeopardize adult fish collection and its ability to meet mitigation obligations. Annual river flow reductions are required in order to install and maintain the weir. In years with significant winter water flows, extensive repairs have been necessary to repair weir damage, including scouring (eroding) the weir foundation. Scouring creates holes that allow adult chinook salmon to pass through the weir and continue upstream past the fish ladder entrance. In years where extensive damage has occurred, flow reductions of approximately five to nine days have been necessary. Extended periods of flow reduction negatively impact the availability of steelhead habitat in the river, which reduces the amount of cover from predation and increases fish densities in the remaining habitat, thus increasing the potential for disease to spread. Lowering flows can also degrade habitat by raising temperatures and increasing turbidity (NMFS 2009).

The CDFG maintains native fish, wildlife, plant species, and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The CDFG is also responsible for the diversified use of fish and wildlife, including recreational, commercial, scientific, and educational uses. In consideration of the alternatives proposed by Reclamation to address problems with the weir, the CDFG must continue to regulate fishing in a manner that provides adequate protection of chinook salmon and Central Valley steelhead trout in the project vicinity in order to fulfill its mission.

Project Alternatives

Two approaches to meeting the purpose and need for the project are evaluated in the EIS/EIR: modifying the fish passageway by extending the ladder to Nimbus Dam and removing the diversion weir structure (Alternative 1) and replacing the weir structure (Alternative 2).

Alternative 1 involves the construction of a fish passageway from the Hatchery to the stilling basin downstream of Nimbus Dam and removing the diversion weir. Nimbus Dam would function as the upstream barrier to fish migration. The construction cost for Alternative 1 is estimated at $6.5 million. Two implementation options for Alternative 1—Alternative 1A and Alternative 1C—are being evaluated because the CDFG is considering modifying fishing closure regulations. Alternative 1A is consistent with Fish and Game Code and would not require that fishing regulations be modified. Alternative 1C requires a modification of fishing regulations to be approved by the Fish and Game Commission. The commission regulates the taking and possession of fish and other animals. The commission must consider and adopt new regulations or changes to existing regulations at no fewer than three meetings annually (Fish and Game Code, Section 204, et seq.). Reclamation has identified Alternative 1 as the preferred alternative.

Alternative 2 involves replacing the weir with a new weir immediately upstream. This alternative would add additional entrances to the fish ladder but would continue to use most of the ladder. The structure would be fish tight, preventing adult fish from bypassing the weir and continuing upstream. The structure would be permanent, would not require annual installation or flow reductions, and would include a six-bay bypass that would allow structure maintenance without reducing river flows. The construction cost for Alternative 2 is estimated at $12 million.

The No Action Alternative would continue using the diversion weir. Annual operations and maintenance and river flow reductions would continue to be required.

The four alternatives under consideration are as follows:

- ***Alternative 1A—Construction of a modified fish passageway and removal of the diversion weir.*** Fishing closures would apply all year within a radius of 250 feet of the modified fish passageway entrance and the existing Hatchery fishway outfall, based on existing fishing regulation Title 14 CCR, 2.35. The river is closed during spawning season, from September 15 to December 31, from the Hazel Avenue Bridge to the USGS gaging station cable crossing, in accordance with Title 14 CCR, 7.50(b)(5)(B). These closures would be consistent with Fish and Game code and would not require any discretionary action by the Fish and Game Commission.

- ***Alternative 1C—Construction of a modified fish passageway and removal of the diversion weir.*** The Fish and Game Commission would implement a new fishing regulation to close fishing year-round between Nimbus Dam and the USGS gaging station cable crossing. New fishing regulations and closures would be at the discretion of the Fish and Game Commission.

- ***Alternative 2—Replacement of the diversion weir with a six-bay bypass and a denil fish ladder.*** (A denil fish ladder is a roughened ramp that is smaller and requires less flow than a pool and weir-style fish ladder.) Existing fishing closures within 250 feet of the fish ladder entrance and outfall would remain in effect.

- ***No Action Alternative*—**Continue existing operations and conditions.

Reclamation is considering three visitor management options for Nimbus Shoals that could be implemented under Alternative 1A, 1C, or 2. Currently, the public has full access to Nimbus Shoals from 6:00 AM to 9:00 PM during the summer and from 7:00 AM to 7:00 PM during the winter. The three alternative visitor management options for Nimbus Shoals are public vehicle access with defined parking, walk-in only access (no public vehicle access), and no public access. At this time, Reclamation has not identified a preferred visitor management option.

One additional alternative, Alternative 1B, was previously considered and was presented at the public scoping meetings. Alternative 1B is no longer being considered by Reclamation and CDFG, but it is described in Section 2.7, Alternatives Considered but Eliminated from Detailed Evaluation.

Environmental Consequences

The environmental effects of the proposed project alternatives and the No Action Alternative described in Chapter 4 are presented in Table ES-1. The description focuses on the key differences among alternatives, where they exist.

The environmental effects of the programmatic visitor management options are presented in Table ES-2 for Alternative 1A and in Table ES-3 for Alternative 2.

Fisheries

Under Alternative 1A, there would be impacts on the fisheries in the project area during construction and the operation of the new passageway, from removing the weir, and from increased sportfishing pressures. Removing the weir would allow all spawning fish to enter the Nimbus Dam stilling basin, instead of being directed into the Hatchery at the weir. With the increase in fish densities in the stilling basin, angler success rates are expected to increase, along with the number of anglers using the area, resulting in increased sportfishing pressures on chinook salmon and steelhead in the area. Chinook salmon and steelhead are protected under both the federal and state ESAs, so a significant adverse effect could occur under Alternative 1A, as these protected species would be highly vulnerable to sport fish harvest in the stilling basin under the existing fishing regulations, especially during spawning time. This impact could be mitigated to less than significant by closing public access to Nimbus Shoals.

Continued sportfishing in the area would also result in the potential for increased spread of the New Zealand mudsnail (*Potamopyrgus antipodarum;* NZMS). This invasive species has been identified in the lower American River (CDFG 2008a, 2010). This species of snail is known to spread by attaching itself to the wading boots of anglers and on fishing gear and then unattaching itself in new areas. If the NZMS were accidentally transported to Lake Natoma, upstream of Nimbus Dam, on the clothing or gear of anglers, the water supply would be contaminated.

Infestation of the American River Hatchery, a trout hatchery next to the Nimbus Hatchery, is another concern. Although the American River Hatchery employs strict biosecurity measures, infestation is a possibility. If it were to become infested, the CDFG would have to find a way to completely disinfect it or move it to a new location in order to prevent the spread of the NZMS. Because trout from this hatchery are used to stock areas that do not contain the NZMS, the CDFG would not be able to stock trout until the issue was resolved, which would impact the trout hatchery program across the state. Infestation of the Nimbus Hatchery is a lesser concern because fish entering and exiting the Nimbus Hatchery are returning to anadromous waters in areas where evidence of the NZMS has been found.

Under Alternative 1C, impacts from constructing and operating the fish passageway are similar to those under Alternative 1A, except that impacts from sportfishing would be less than significant due to the change in fishing regulations. Eliminating fishing in the area under Alternative 1C would protect sensitive fish species at critical life stages, likely increasing the number of fish that rear and spawn in the stilling basin. By increasing the overall abundance of fish in the area, the Hatchery would be more likely to meet its production goals, which would be a beneficial impact. Eliminating fishing from Nimbus Dam downstream to the USGS gaging cable would also have the beneficial impact of helping to limit the spread of the NZMS by anglers.

Under Alternative 2, impacts on fisheries would occur during in-water construction, which would occur from June through September over the course of two years. Operating the new diversion weir would have beneficial impacts on the fishery resources in the project area because a new weir would negate the need to reduce river flows to install the weir. Because the new fish-tight weir would reduce the number of adult fish passing up to the stilling basin, there could be less sport fish harvest. Reducing this harvest would have a beneficial impact by reducing mortality and supporting the Hatchery's mission.

Additionally, the new weir would be built to withstand flows of up to 160,000 cfs, which would further reduce the need for major repairs. However, because the new weir would contain more moving parts, maintenance and repair costs would increase, and if any significant damage were to occur, the flow reductions during repairs would likely take longer. The extent of the impacts from these flow reductions would depend on the amount of time required to make the repairs, as well as the time of year when repairs are made.

Under Alternatives 1A and 1C, and to a lesser extent under Alternative 2, removing the aging weir would have the beneficial impact of increasing operational flexibility because the need for flow reductions to install, remove, and repair the weir would be reduced.

Under the No Action Alternative, the fish weir would continue to be used, short duration flow reductions to install the weir each year would continue, and extended flow reductions to perform major repairs after significant flooding would continue. Significant flooding occurs approximately once every ten years. Major repairs require the lowering of water flows to allow in-river construction. Reducing water flow would result in less than significant impacts on fisheries because most flow reductions would last less than one day. However, during significant floods, repairs to the weir may take several days or require reduced flows. Significant floods occur, on average, every ten years.

Biological Resources

Implementing Alternative 1A or Alternative 1C would result in temporary impacts on vegetation and wildlife during construction. Vegetation communities would also be permanently affected by project construction. Approximately 0.1 acre of wetland will be permanently impacted by construction of the fish passageway. Approximately one acre of "other waters" will be temporarily impacted. Impact mitigation would be determined during the consultation process for Clean Water Act Section 404 and 401 and CDFG Section 1602 permits. In addition, environmental commitments, such as BIO-2, BIO-3, and BIO-7 (Appendix C), would mark wetlands, would require the use of a biological monitor, and would develop a wetland mitigation plan, as required. Impacts on wetlands would be less than significant.

Construction under Alternative 1A or 1C would require transplanting one elderberry shrub, the host plant for the threatened valley elderberry longhorn beetle. In addition, a 30-foot buffer around three elderberry shrubs would overlap the construction zone; however, a survey conducted in July 2010 by Reclamation and the USFWS indicated that the construction would likely be able to proceed without impacting the shrubs. All adverse effects on elderberry shrubs would be fully compensated as required through Section 7 consultation and in accordance with USFWS protocols. As a result, the effects on the valley elderberry longhorn beetle would be less than significant.

Fishing closures under Alternative 1C could reduce the number of recreationists at Nimbus Shoals. This would greatly reduce impacts on biological resources in the project area caused by recreationists.

Impacts on vegetation and wildlife from construction under Alternative 2 would be less than under Alternative 1A or 1C because of the smaller construction footprint. No wetlands or elderberry shrubs would be impacted under Alternative 2. Therefore, impacts would be less than significant

Under Alternative 2, impacts on biological resources resulting from recreational use of Nimbus Shoals may decrease due to fewer users. This is because the fish-tight replacement weir would block more adult fish than the existing weir, reducing fishing opportunities.

Recreation

Under Alternatives 1A and 1C, construction would temporarily impact parking in the project area used by recreationists, public access to Nimbus Shoals, and the American River Parkway bike trail. Reclamation would reroute bike trail traffic at times during construction of the portion of the fish passageway next to the CSUS Sacramento Aquatic Center entrance road. Signs would be installed to direct bikers toward the temporary detour. As such, temporary impacts on bike trails would be less than significant. Placing a viewing plaza at the Hatchery would enhance viewing opportunities, resulting in beneficial impacts.

Removing the weir under Alternatives 1A and 1C would not improve or impact boating within the project area. A county ordinance prohibits boating within 1,000 feet of Nimbus Dam. Paddling and rowing watercraft could still be launched from most of the lower American River below the weir, subject to local and seasonal restrictions; therefore, impacts would be less than significant.

Alternative 1C would result in fewer fishing opportunities in the project area. This impact would be less than significant because anglers would still be able to fish in the area west of the USGS gaging station crossing. Although this alternative would result in fewer fishing opportunities in the project area, it would indirectly result in beneficial impacts on this recreation resource by increasing the overall abundance of fish in the area. This would create better sportfishing opportunities within the lower American River.

Construction under Alternative 2 would temporarily impact parking in the project area used by recreationists. Alternative 2 would not provide for the appropriate conditions for hand-launching paddling/rowing watercraft from Nimbus Shoals because boaters could become entrained on the weir.

As the new weir under Alternative 2 would likely decrease numbers of fish passing up to the stilling basin, there could be fewer sportfishing harvest opportunities in the project area between the new weir and the Nimbus Dam. As such, under this alternative, impacts on sportfishing conditions at the project area would be greater than those described under Alternative 1A but would remain less than significant.

Cultural Resources

Reclamation surveyed and evaluated the Nimbus Fish Hatchery complex and determined it to be ineligible for listing on the NRHP. Reclamation would remove the weir as part of the proposed project independent of any changes in fishing regulations made by CDFG. Therefore, the weir was not evaluated for eligibility under the California Register of Historical Resources, only for eligibility under the NRHP. The Nimbus Fish Hatchery complex does not qualify as a historic resource, and there would be no historic architectural resources impacted under Alternatives 1A, 1C, and 2. The SHPO concurred with this determination on September 7, 2010.

Under Alternatives 1A and 1C, there is a potential to significantly impact unrecorded or subsurface archaeological resources in the direct impact zones of the weir, flume, ladder, rock channel, auxiliary water supply pipes, and construction access pathways and staging area on Nimbus Shoals. Mitigation would be implemented to reduce impacts due to unanticipated discoveries to less than significant.

Native American consultations are ongoing and tribal concerns or the presence of ethnographic resources is unknown at this time. Potential impacts could be reduced to less than significant by implementing mitigation as identified by continued consultation.

Geology and Soils

Constructing the proposed project and removing the weir may result in some erosion and loss of topsoil. Best management practices (BMPs), such as using silt fences or straw bales to control erosion, would minimize impacts; all project alternatives would have less than significant impacts.

Erosion resulting from recreational use of Nimbus Shoals may decrease under Alternative 1C and Alternative 2 because there may be fewer users of the shoals with the implementation of fishing closures (Alternative 1C) or reduced fishing opportunities (Alternative 2).

Water Resources

During construction of all project alternatives, there would be an increased potential for water quality degradation due to disturbance of river sediments and silt runoff from disturbed areas. BMPs, such as turbidity curtains, silt fences, or straw bales for erosion control, would be implemented to minimize potential river siltation; impacts would be less than significant.

All project alternatives would also result in some alteration in the geomorphology of the lower American River; impacts would be less than significant.

Water quality degradation resulting from recreational use of Nimbus Shoals may decrease under Alternative 1C and Alternative 2 because there may be fewer users of the shoals with the implementation of fishing closures (Alternative 1C) or reduced fishing opportunities (Alternative 2).

Hazardous Materials

Construction for all project alternatives would require that hazardous materials be transported to, temporarily stored on, and used at the project area. Common hazardous materials that would likely be found at the site during construction are petroleum, oils, lubricants, solvents, and cleaners, primarily used for operating construction equipment. The temporary presence and use of these materials at the project area would increase the risk of a release of hazardous materials to the environment. The risk of fires and explosion hazards would also be increased because flammable and potentially explosive materials would be present at the site during construction. Adverse impacts would be less than significant because construction would comply with all applicable federal, state, county, and municipal laws, ordinances, and regulations and because BMPs including proper handling and storage would be employed. Specific BMPs to be employed are presented in Section 4.7.1.

Public Health and Safety

The temporary presence and use of hazardous materials at the project area increase the risk of accidents that could affect the health and safety of workers and other persons in the vicinity. BMPs would be used to reduce these risks to less than significant.

Under the Alternatives 1A and 1C, the risks associated with installing, removing, and maintaining the weir would be eliminated once the weir is removed. Although some risk of accidents would remain for persons conducting maintenance on the fish passageway, because this would not involve in-river work, the overall impact on worker safety would be beneficial. Under Alternative 2, the magnitude of health and safety risks for maintaining the new weir would be similar to current conditions, due to the institution of safety procedures and use of trained personnel to maintain the weir, so the impacts would be less than significant.

Infrastructure

The proposed action would not substantially increase the demand for utilities or public services, so the impacts would be less than significant. Traffic in the project area would increase during construction; no lanes or roads would need to be closed, and impacts would be temporary and less than significant. Construction would also temporarily impact the availability of parking in the Hatchery parking lot and use of the American River Parkway bike trail; impacts would be less than significant. Temporary construction-related impacts on parking and bicycle and pedestrian access would be less under Alternative 2 than under Alternatives 1A and 1C.

Energy

The proposed action would have beneficial impacts on energy production. Under Alternatives 1A and 1C, the impact on energy production is a gain of 3,723 megawatt-hours (MWh) per year, valued at $186,150 per year. There would be a temporary net loss of energy production of 284 MWH per year during project construction prior to the removal of the diversion weir, valued at $14,200 per year. Under Alternative 2, the gain is 584 MWh per year, valued at about $29,200 per year.

Air Quality

The proposed project would have less than significant impacts on air quality during construction. Impacts would be minimized by implementing BMPs and the environmental commitments (Appendix C).

Noise

Significant noise impacts would occur from construction equipment operating in the riverbed during weir demolition under Alternatives 1A, 1C, and 2, affecting the residents closest to the project area on the north side of the American River. Those noise levels would exceed the land use compatibility criteria of the Sacramento County general plan. It is not practical to provide noise shielding for equipment operating in the riverbed, so there are no practical noise mitigation measures for any of the alternatives. However, it is worth noting that the construction noise impacts under each of the alternatives would be temporary and that none of the alternatives would generate significant noise during evening or nighttime hours; construction noise would be limited to normal daytime work hours under each alternative. Significant cumulative noise impacts would also occur as weir demolition would likely overlap with other construction projects in the project area.

Land Use

The proposed action would not alter land use in the project area.

Visual Resources

The proposed project would have temporary impacts on visual and aesthetic resources during construction; the impacts would be less than significant.

Removing the weir would be beneficial to visual and aesthetic resources under Alternatives 1A and 1C. This is because the weir compromises the visual character of the American River, and its removal would aesthetically enhance the view of the river. The construction of a new fish passageway southeast of Nimbus Hatchery, with a tie-in to the existing fish passageway under this alternative, would not adversely impact visual resources.

Constructing a replacement weir under Alternative 2 would not substantially degrade the visual character of the area. The replacement weir would look different from the existing weir and would be a solid concrete structure, visible at the surface of the river. However, the visual and aesthetic character of the area is already compromised by the built environment and weir.

Socioeconomics and Environmental Justice

During construction, the proposed action would result in a marginal increase in employment. Potential spending by construction employees within the project area could result in a short-term, localized, beneficial economic stimulus over the construction period. After construction, implementing the proposed action would not change employment or business volume. The number of Hatchery employees is not expected to change.

Implementing the proposed action would affect public access to the project area during construction and thus temporarily impact the quality of life of the visitors to the project area. After construction, the new viewing plaza and modified walkway under Alternative 1 would enhance the visitor experience and thus would have a beneficial impact on visitors to the project area.

Under Alternative 1C, completely eliminating fishing in the area between the USGS gaging cable and the Nimbus Dam would reduce sportfishing opportunities in the vicinity. This would impact the quality of life of the visitors to the project area. Under Alternative 2, operating the new diversion weir would impact the quality of life due to possible decreased fishing opportunities.

No environmental justice impacts are expected to occur.

Visitor Management Options for Nimbus Shoals

Under Alternative 1A, visitor use of Nimbus Shoals is expected to increase due to the increased number of fish in the stilling basin and the attraction of the fish passageway. Under Alternative 2, visitor use of Nimbus Shoals is expected to decrease due to the decrease in fish in the stilling basin and resulting decrease in fishing opportunities.

Under either alternative, both the public vehicle with defined parking and walk-in only options could result in decreased visitation. Some visitors could be deterred by the defined parking area and could choose not to visit the area since they could no longer drive to the water's edge. Other visitors could be unwilling to walk to the shoals from the Hatchery parking lot or other nearby parking areas.

Under both Alternative 1A and 2, adverse impacts would be less than significant for the three visitor management options. Beneficial impacts would also occur. Impacts are described in Tables ES-2 and ES-3, in Chapter 4, and in Tables 5-2 and 5-3.

Conclusions

Based on this EIS/EIR, all project alternatives are anticipated to result in significant adverse impacts on noise. Potentially significant but mitigable to less than significant impacts are expected for cultural resources. Less than significant adverse impacts are expected for biological resources, recreation, water resources, geology and soils, public health and safety, infrastructure, air quality, visual resources, and socioeconomics. No effects are expected for land use and environmental justice.

In addition, implementing Alternative 1A may have significant but mitigable to less than significant adverse impacts on fisheries. Alternatives 1C and 2 would have less than significant adverse impacts on fisheries.

All project alternatives are expected to have beneficial impacts on fisheries, recreation, cultural resources, energy, and socioeconomics. Alternatives 1A and 1C are anticipated to have further beneficial impacts on public health and safety and visual resources.

Beneficial impacts on biological resources, water resources, geology and soils are expected under Alternative 1C and Alternative 2.

Under all project alternatives, cumulative effects are expected to be significant for noise. Fisheries, biological resources, recreation, cultural resources, water resources, geology and soils, public health and safety, infrastructure, air quality, visual resources, and socioeconomics are expected to experience less than significant cumulative effects.

Table ES-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
Fisheries	Significant adverse effect mitigable to less than significant/beneficial effect: • Significant increased sportfishing pressure due to more fish in the stilling basin; mitigable to less than significant by closing public access to Nimbus Shoals. • Continued sportfishing would result in potential for increased spread of the NZMS. • Flow would not need to be reduced to install, remove, and repair the weir, resulting in increased operational flexibility and beneficial impacts on fisheries.	Less than significant adverse effect/beneficial effect: • Less than significant increased sportfishing pressure due to fishing closure. • Fishing closure would reduce potential spread of the NZMS. • Fishing closure would likely increase the abundance of fish in the area, helping the Hatchery meet its production goals. • Flow would not need to be reduced to install, remove, and repair the weir, resulting in increased operational flexibility and beneficial impacts on fisheries.	Less than significant adverse effect/beneficial effect: • Reduced numbers of fish in the stilling basin would reduce fish mortality from sportfishing and would support the Hatchery's mission. • Flow would not need to be reduced to install and remove the new weir but would be required for repairs. Increased operational flexibility and beneficial impacts on fisheries would occur, but to a lesser extent than under Alternatives 1A and 1C.	Less than significant adverse effect: • Reduced river flows would continue to be required to install, remove, and repair the weir. • Continued impacts of weir operation on ability of the Hatchery to meet annual production goals.
Biological resources	Less than significant adverse effect: • 0.1 acre of wetlands would be temporarily and permanently impacted. Impacts would be minimized by implementing mitigation	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, plus • Reduced visitation at Nimbus Shoals due to fishing closure would greatly reduce impacts, such as vegetation	Less than significant adverse effect/beneficial effect: • No wetlands or elderberry shrubs would be impacted. • Impacts on vegetation and	Less than significant adverse effect: • Biological resource impacts on Nimbus Shoals caused by recreationists would continue.

Table ES-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	determined by permitting and environmental commitments (Appendix C). • One elderberry shrub would be transplanted. All adverse effects on elderberry shrubs would be fully compensated. • Vegetation communities would be temporarily or permanently impacted. • Wildlife would be temporarily impacted during construction.	trampling and wildlife disturbance, by recreationists.	wildlife from construction would be less than under Alternative 1A or 1C because of the smaller construction footprint. • Reduced visitation at Nimbus Shoals from reduced fishing opportunities would greatly reduce impacts, such as vegetation trampling and wildlife disturbance, by recreationists.	
Recreation	Less than significant adverse effect/beneficial effect: • Increased fishing opportunities because more fish would be able to move upstream after the weir removal. • Temporary disruptions in parking, access to Nimbus Shoals, and bicycle trail during construction. • Viewing plaza would enhance fish viewing opportunities.	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, except • Reduced sportfishing opportunities due to fishing closure. • Indirect beneficial impact by increasing the overall abundance of fish in the area, creating better sportfishing opportunities within the lower American River.	Less than significant adverse effect/beneficial effect: • Temporary disruptions would be limited to parking due to reduced construction footprint. • No impact on or improvement in boating opportunities. • Reduced sportfishing opportunities due to reduction in fish in the stilling basin.	No effect.

Table ES-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	• No impact on or improvement in boating opportunities.			
Cultural resources	Significant adverse effect mitigable to less than significant: • No historical architecture impacts because Reclamation determined the weir and Hatchery do not qualify as a historic resource. The SHPO concurred with this determination on September 7, 2010. • Native American consultations are ongoing and tribal concerns or the presence of ethnographic resources is unknown at this time. Potential impacts could be reduced to less than significant by implementing mitigation as identified by continued consultation. • Potential to significantly impact unrecorded or subsurface archaeological resources at Nimbus Shoals during construction; can be	Significant adverse effect mitigable to less than significant: • Similar to Alternative 1A.	Less than significant adverse effect: • Similar to 1A. • Potential to impact unrecorded or subsurface archaeological resources would be less than under Alternatives 1A and 1C.	No effect.

Table ES-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	mitigated to less than significant.			
Geology and soils	Less than significant adverse effect: • Some erosion and loss of topsoil would occur during construction. BMPs would minimize impacts.	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, plus • Erosion resulting from recreation at Nimbus Shoals may decrease with decreased use due to fishing closures.	Less than significant adverse effect/beneficial effect: • Similar to Alternative 1A. • Erosion resulting from recreation at Nimbus Shoals may decrease with decreased use due to the reduced fishing opportunities.	Less than significant adverse effect: • Some erosion and loss of topsoil would continue from recreation at Nimbus Shoals.
Water resources	Less than significant adverse effect: • Increased potential for water quality degradation due to disturbance of river sediments and silt runoff from disturbed areas during construction. BMPs would minimize impacts. • Some alteration in the geomorphology of the lower American River. • Increased potential for water quality degradation from increased recreational use.	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, except • Water quality degradation resulting from recreation at Nimbus Shoals may decrease with decreased use due to fishing closures.	Less than significant adverse effect/beneficial effect: • Similar to Alternative 1C.	Less than significant adverse effect: • Some water quality degradation would continue from recreation at Nimbus Shoals.
Hazardous materials	Less than significant adverse effect:	Less than significant adverse effect:	Less than significant adverse effect:	Less than significant adverse effect

Table ES-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	• Temporary presence and use of hazardous materials during construction would increase the risk of a release to the environment. BMPs would minimize risk. • Risk of fires and explosion hazards would increase during construction because flammable and potentially explosive materials would be present. BMPs would minimize risk.	• Same as Alternative 1A.	• Similar to Alternative 1A, but impacts would be slightly less with reduced construction footprint.	• Weir would continue to require maintenance and periodic significant repairs, potentially involving the use of hazardous materials, risking a release to the environment. BMPs would minimize risk.
Public health and safety	Less than significant adverse effect/beneficial effect: • Temporary presence and use of hazardous materials during construction would increase the risk of accidents that could affect health and safety. BMPs would minimize impacts. • Risk of accidents associated with installing, removing, and maintaining the weir would be eliminated once the weir is removed. Risk of accidents for persons conducting maintenance on the fish passageway would be less than current	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A.	Less than significant adverse effect: • Risks for maintaining the new weir would be similar to current conditions due to the institution of safety procedures and use of trained personnel.	Less than significant adverse effect: • Risks associated with installing, removing, and maintaining the weir would continue.

Table ES-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	conditions because it would not involve in-river work.			
Infrastructure	Less than significant adverse effect: • No substantial increase in the demand for utilities or public services. • Temporary traffic increase during construction; no lanes or roads would be closed. • Temporary impact during construction on availability of some parking spaces and bicycle and pedestrian access.	Less than significant adverse effect: • Same as Alternative 1A.	Less than significant adverse effect: • Similar to Alternative 1A, but construction-related impacts on parking and bicycle and pedestrian access would be reduced, due to reduced construction footprint.	No effect.
Energy	Beneficial effect: • Temporary net loss of energy production during project construction before the removal of the diversion weir valued at $14,200 per year. • During operation and maintenance phase, gain of energy production valued at $186,150 per year.	Beneficial effect: • Same as Alternative 1A.	Beneficial effect: • During operation and maintenance phase, net gain in energy production valued at about $29,200 per year.	No effect.
Air quality	Less than significant adverse effect:	Less than significant adverse effect:	Less than significant adverse effect:	No effect.

Table ES-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	• Construction emissions would be minimized by implementing BMPs and environmental commitments (Appendix C).	• Same as Alternative 1A.	• Construction emissions would be reduced compared to Alternatives 1A and 1C due to the smaller construction footprint.	
Noise	Significant adverse effect: • During weir demolition, daytime noise levels would temporarily exceed land use compatibility requirements for residents closest to the project on the north side of the river.	Significant adverse effect: • Same as Alternative 1A.	Significant adverse effect: • During weir construction and demolition, daytime noise levels would temporarily exceed land use compatibility requirements for residents closest to the project on the north side of the river.	No effect.
Land use	No effect.	No effect.	No effect.	No effect.
Visual resources	Less than significant adverse effect/ beneficial effect: • Temporary visual impacts during construction. • Removing the weir would aesthetically enhance the view of the river.	Less than significant adverse effect/ beneficial effect: • Same as Alternative 1A.	Less than significant adverse effect: • Temporary visual impacts during construction.	No effect.

Table ES-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
Socioeconomics and environmental justice	Less than significant adverse effect/beneficial effect: • Temporary increase in employment and local business volume during construction. • Temporary reduction in quality of life for visitors due to disruptions in access during construction. • During operation and maintenance, new viewing plaza and modified walkway would enhance visitor experience.	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, plus • Fishing closure would result in reduced quality of life for visitors.	Less than significant adverse effect/beneficial effect: • Temporary increase in employment and local business volume during construction. • Temporary reduction in quality of life for visitors due to disruptions in access during construction. • Reduced fishing opportunities would result in reduced quality of life for visitors.	No effect.

Table ES-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
Public safety	Less than significant adverse effect: • Opportunities for drowning and risks to users from flow increase would increase with increased visitation. • Vehicle break-ins and vandalism would increase with increased visitation. • Vehicle-related user conflicts would increase with increased visitation.	Less than significant adverse effect/beneficial effect: • Similar to no change in access except that vehicle-related user conflicts would be reduced compared to no change in access.	Less than significant adverse effect/beneficial effect: • Impacts related to increase in visitation would be reduced compared to no change in access and defined parking area options because visitor numbers would be reduced by their unwillingness to walk in. • Risk to users from flow increases would be reduced because visitors would be more likely to evacuate more quickly if not trying to save a car. • Vehicle break-ins on neighboring roads could increase because vehicles would be unattended. • Vehicle-related user conflicts would be greatly reduced.	Beneficial effect: • Public safety risks would be greatly reduced.

Table ES-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
Operation and maintenance requirements	Less than significant adverse effect: • Need for sanitation facilities and trash removal would increase with increased visitation.	Less than significant adverse effect: • Similar to no change in access. Impacts could be reduced by providing sanitation and trash collection facilities near parking area. • Increased maintenance needs for new facilities.	Less than significant adverse effect: • Similar to defined parking option. • Increase in need for sanitation facilities and trash removal would be reduced compared to no change and defined parking area because visitor numbers would be reduced by their unwillingness to walk in.	Beneficial effect: • Need for trash removal would be greatly reduced.
Security	Less than significant adverse effect: • Incidences of vandalism, illegal parking, illegal fishing, and OHV use in the rock channel portion of the fish passageway would increase with increased visitation; however, existing patrols should be sufficient to address this.	Less than significant adverse effect: • Same; no change in access.	Less than significant adverse effect: • Illegal activity would be reduced compared to no change and defined parking area because visitor numbers would be reduced by their unwillingness to walk in. • Vehicle break-ins would shift to nearby parking areas.	Less than significant adverse effect: • Increase in enforcement would be necessary to maintain closure.

Table ES-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
Fishery management	Significant adverse effect: • Significant adverse impact from increased sportfishing pressure.	Significant adverse effect/ beneficial effect: • Significant adverse impact from increased sportfishing pressure. • Defined parking would lessen impacts on water quality, resulting in a beneficial impact. • Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.	Significant adverse effect/beneficial effect: • Significant adverse impact from increased sportfishing pressure would be somewhat reduced because visitor numbers would be reduced by unwillingness to walk-in. • No vehicle access would greatly reduce impacts on water quality, resulting in a beneficial impact. • Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.	Beneficial effect: • No access would protect fisheries from sport harvest. • No access would greatly reduce impacts on water quality, resulting in a beneficial impact. • No access would reduce lead sinker accumulation, resulting in a beneficial impact.
Environmental	Less than significant adverse effect: • Litter and garbage accumulation would increase with increased	Less than significant adverse effect: • Litter and garbage accumulation would increase with increased	Less than significant adverse effect: • Vehicle-related impacts would be greatly	Beneficial effect: • Impacts would be greatly reduced.

Table ES-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
	visitation. • Vehicle erosion damage, including damage to wetlands, would increase with increased visitation. • Risk of oil and fuel spills entering water would increase with increased visitation.	visitation. • Vehicle erosion damage, including damage to wetlands, greatly reduced. • Risk of oil and fuel spills entering water would be greatly reduced.	reduced. • Litter and garbage accumulation would be reduced compared to no change and defined parking area because visitor numbers would be reduced by their unwillingness to walk in.	
Recreation	Less than significant adverse effect/beneficial effect: • Fishing and fish viewing would increase during salmon spawning season. • Vehicle-related user conflicts would increase with increased visitation. • No change to boating.	Less than significant adverse effect/beneficial effect: • Fishing and fish viewing would increase during salmon spawning season. • Defined parking area would restrict ability to drive up to water's edge. • Possible new facilities and amenities would enhance visitor experience. • Vehicle-related user conflicts would be reduced, increasing	Less than significant adverse effect/beneficial effect: • Walk-in would be viewed as an inconvenience and would reduce visitor numbers. • Fishing and fish viewing would increase during salmon spawning season. • Possible new facilities and amenities would enhance visitor experience. • Vehicle-related user conflicts would be	Less than significant adverse effect: • Sportfishing and other forms of recreation would not be allowed and would shift to other nearby areas. • Fish viewing would still be available at the Hatchery.

Table ES-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
		safety and thereby enhancing the visitor experience for some. • No change to boating.	greatly reduced, increasing safety and thereby enhancing the visitor experience for some. • No change to boating.	
Related costs	• Operation and maintenance costs would increase as a result of increased need for sanitation facilities and trash removal.	• Capital cost would increase due to construction of ADA improvements. • Capital cost would increase if additional facilities and amenities were provided. • In addition, capital cost would increase in order to develop and maintain the parking area.	• Similar to defined parking, although cost may be reduced because visitor numbers would be reduced by their unwillingness to walk in.	• Law enforcement costs would increase in order to maintain the closure. • Costs related to visitor use, such as trash removal, would be greatly reduced.

Table ES-3. Alternative 2: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
Public safety	Beneficial effect: • Public safety risks would decrease as a result of decreased visitation.	Beneficial effect: • Same as no change.	Beneficial effect: • Similar to no change; public safety risks would be further reduced because visitor numbers would be reduced by their unwillingness to walk in.	Beneficial effect: • Public safety risks would be greatly reduced.
Operation and maintenance requirements	Beneficial effect: • The need for sanitation facilities and trash removal would be less than Alternative 1 as a result of decreased visitation.	Beneficial effect: • Same as no change.	Beneficial effect: • Similar to no change; operation and maintenance effort would be further reduced because visitor numbers would be reduced by their unwillingness to walk in.	Beneficial effect: • Operation and maintenance effort would be greatly reduced.
Security	Beneficial effect: • Enforcement issues, such as vandalism and vehicle break-ins, would decrease as a result of decreased visitation.	Beneficial effect: • Same as no change.	Beneficial effect: • Similar to no change; enforcement issues would be further reduced because visitor numbers would be reduced by willingness to walk-in.	Less than significant adverse effect: • Increase in enforcement necessary to maintain closure.
Fishery management	Less than significant adverse effect:	Less than significant adverse effect/beneficial	Less than significant adverse effect/beneficial	Beneficial effect: • No access would protect

Table ES-3. Alternative 2: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
	• Sportfishing pressure would be reduced due to reduced number of fish in the stilling basin.	effect: • Sportfishing pressure would be reduced due to reduced number of fish in the stilling basin. • Defined parking would lessen impacts on water quality, resulting in a beneficial impact. • Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.	effect: • Sportfishing pressure would be further reduced because visitor numbers would be further reduced by their unwillingness to walk in. • No vehicle access would greatly reduce impacts on water quality, resulting in a beneficial impact. • Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.	fisheries from sport harvest. • No access would greatly reduce impacts on water quality, resulting in a beneficial impact. • No access would reduce lead sinker accumulation, resulting in a beneficial impact.
Environmental	Beneficial effect: • All impacts such as trash accumulation, and erosion would decrease as a result of decreased visitation.	Beneficial effect: • Similar to no change, but erosion and water quality impacts from vehicle use would be further reduced.	Beneficial effect: • Similar to defined parking but all impacts would be further reduced because visitor numbers would be reduced by their unwillingness to walk in.	Beneficial effect: • All impacts would be greatly reduced.

Table ES-3. Alternative 2: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
Recreation	Less than significant adverse effect: • All uses would continue; however, reduced fishing opportunities would result in decreased visitation.	Less than significant adverse effect/beneficial effect: • All uses would continue; however, reduced fishing opportunities would result in decreased visitation. • Visitor experience would be enhanced if additional facilities and amenities were provided.	Less than significant adverse effect/beneficial effect: • Similar to defined parking, although visitation may be further reduced by their unwillingness to walk in.	Less than significant adverse effect: • All uses would end. Fishers and other recreationists would use other nearby fishing and recreation areas.
Related costs	• Operation and maintenance costs would be reduced because of decrease in public use.	• Capital cost would increase due to construction of ADA improvements. • Capital cost would increase if additional facilities and amenities were provided. • Operation and maintenance costs would be reduced because of decrease in public use.	• Similar to defined parking, although cost may be reduced because visitor numbers would be further reduced by their unwillingness to walk in.	• Law enforcement costs would increase in order to maintain the closure. • Costs related to visitor use, such as trash removal, would be greatly reduced.

1. Purpose of and Need for the Proposed Action

1.1 Introduction

The United States Department of the Interior, Bureau of Reclamation (Reclamation), and the California Department of Fish and Game (CDFG) have prepared this environmental impact statement/environmental impact report (EIS/EIR) to address the environmental effects of the proposed removal or replacement of a fish diversion weir (weir) at the Nimbus Fish Hatchery (Hatchery) in Rancho Cordova, Sacramento County, California. These agencies have prepared this EIS/EIR in accordance with the National Environmental Policy Act (NEPA) of 1969, 42 United States Code (USC) Section 4321 et seq., the Council on Environmental Quality (CEQ) regulations for implementing NEPA, 40 Code of Federal Regulations (CFR), Parts 1500-1508, the California Environmental Quality Act (CEQA) of 1970, California Public Resources Code, Section 21000 et seq., as amended, the Guidelines for Implementation of CEQA, Title 14, California Code of Regulations (CCR), Section 15000 et seq., and Reclamation and CDFG guidelines. Reclamation is the NEPA lead agency and the CDFG is the CEQA lead agency.

The Hatchery is on the lower American River, approximately a quarter-mile downstream of Nimbus Dam. The Hatchery was built as mitigation for chinook salmon (*Oncorhynchus tshawytscha*) and Central Valley steelhead trout (*O. mykiss*; “steelhead”) spawning areas blocked by the construction of Nimbus Dam. The weir was constructed to create a barrier in the river that allows adult chinook salmon to locate the entrance to the fish ladder for collection by the Hatchery. The weir is needed from mid-September through mid-December during the chinook salmon spawning season. The weir superstructure is removed for the remainder of the year, although its foundation and concrete piers remain in place year-round. Without the weir superstructure in place to block upstream passage of chinook salmon, sufficient numbers to meet hatchery mitigation production goals could not enter the ladder. Steelhead locate the ladder entrance in sufficient numbers to meet mitigation production goals without the weir superstructure in place. The weir and adjacent fish ladder were constructed in 1955.

1.2 Purpose and Need

The purpose of the proposed project is to create and maintain a reliable system for collecting adult fish to allow Reclamation to remain in compliance with mitigation obligations for spawning areas blocked by the construction of Nimbus Dam, while adequately protecting chinook salmon and Central Valley steelhead trout. Spring-run chinook salmon and Central Valley steelhead trout are listed as threatened under both the federal and state Endangered Species Acts. Fall-run chinook salmon is a candidate for listing under the federal Endangered Species Act and is categorized by the State of California as a species of concern. In addition, the portion of the lower American River within the project area is Essential Fish Habitat (EFH) for the fall-run chinook salmon, as designated in 1999 by the Magnuson-Stevens Act. Reclamation is authorized to replace the weir or to implement its functional equivalent in order to fulfill its obligation to raise four million chinook salmon smolts and 430,000 steelhead yearlings annually at the Hatchery. This obligation was established as a result of the Fish and Wildlife Coordination Act Report (August 14, 1946, 60 Stat. 1080) (United States Fish and Wildlife Service [USFWS] and CDFG 1953), which recommended measures to mitigate the impacts of constructing Nimbus Dam, as authorized by the American River Basin Development Act (October 14, 1949, 63 Stat. 852).

The proposed project would support Reclamation’s need to address problems with the weir that could jeopardize adult fish collection and its ability to meet mitigation obligations. Annual river flow reductions are required in order to install and maintain the weir. In years with significant winter water flows, extensive repairs have been necessary to repair weir damage, including scouring (eroding) the weir foundation. Scouring creates holes that allow adult chinook salmon to pass through the weir and continue upstream past the fish ladder entrance. In years where extensive damage has occurred, flow reductions of approximately five to nine days have been necessary. Extended periods of flow reduction negatively impact the availability of steelhead habitat in the river, which reduces the amount of cover from predation and increases fish densities in the remaining habitat, thus increasing the potential for disease to spread. Lowering flows can also degrade habitat by raising temperatures and increasing turbidity (NMFS 2009). The National Marine Fisheries Service (NMFS) recommended in its September 17, 1999, biological opinion on a project to repair the weir foundation that a long-term solution be developed to eliminate the need to reduce flows in the lower American River to maintain the weir (NMFS 1999).

The CDFG maintains native fish, wildlife, plant species, and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The CDFG is also responsible for the diversified use of fish and wildlife, including recreational, commercial, scientific, and educational uses. In consideration of the alternatives proposed by Reclamation to address problems with the weir, the CDFG must continue to regulate fishing in a manner that provides adequate protection of chinook salmon and Central Valley steelhead trout in the project vicinity in order to fulfill its mission.

1.3 Scope and Organization of the Document

Considered in this EIS/EIR are Alternative 1, including two options regarding fishing regulations, Alternative 2, and the No Action Alternative. Alternative 1 is described in Section 2.3, Alternative 2 is described in Section 2.4, and the No Action Alternative is described in Section 2.5. Alternatives considered but eliminated from analysis are discussed in Section 2.7. Reclamation has identified Alternative 1 as the preferred alternative.

Three visitor management options for Nimbus Shoals are considered at the programmatic level (see Section 2.5). The environmental and socioeconomic effects of the options are described in Section 4, Environmental Consequences.

The environmental effects of Alternative 1, Alternative 2, and the No Action Alternative are evaluated and documented in this EIS/EIR. The existing resource conditions at the project site are described in Section 3, Affected Environment. Along with information presented for the No Action Alternative, these conditions constitute the baseline for analyzing the effects of Alternatives 1 and 2.

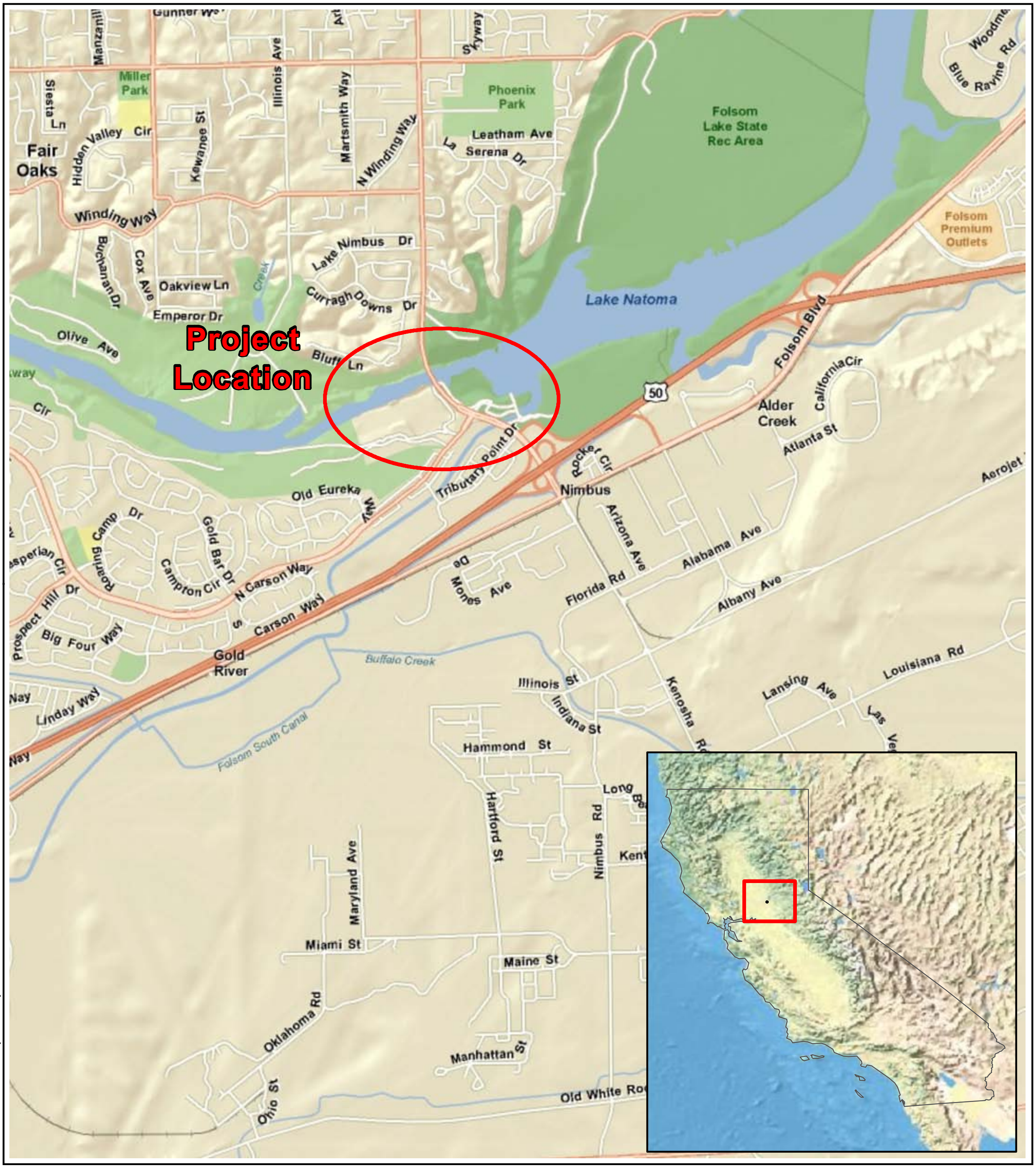
The environmental and socioeconomic effects of the proposed action and the No Action Alternative are described in Section 4, Environmental Consequences. The environmental effects of Alternative 1, Alternative 2, and the No Action Alternative are compared and contrasted in Section 5.

The process by which Reclamation and the CDFG involved the public, resource agencies, and stakeholders in the EIS/EIR preparation and selection process is described in Section 1.6, Public and Agency Involvement.

This document is an analysis of direct impacts (those caused by an action and occurring at the same time and place) and indirect impacts (those caused by an action but occurring later or farther away but at a reasonably foreseeable time or place). Also addressed are the cumulative impacts of Alternative 1, Alternative 2, and the No Action Alternative, when added to other past, present, and reasonably foreseeable future actions, regardless of whether they are federal or nonfederal. Where it is appropriate, avoidance and mitigation measures that could lessen potential impacts are identified.

1.4 Project Location and Background

The project area includes a 74-acre area in Rancho Cordova, California, from Nimbus Dam downstream, along the lower American River to 500 feet downstream of the US Geological Survey (USGS) gaging station cable (Figure 1-1). The project area includes the lower American River, the north and south banks of the river, the Hatchery complex and adjacent parking lot, and Nimbus Shoals, which is east of Hazel Avenue. The Hatchery and weir are about 0.25 mile downstream of Nimbus Dam on the south side of the lower American River (Figure 1-2).

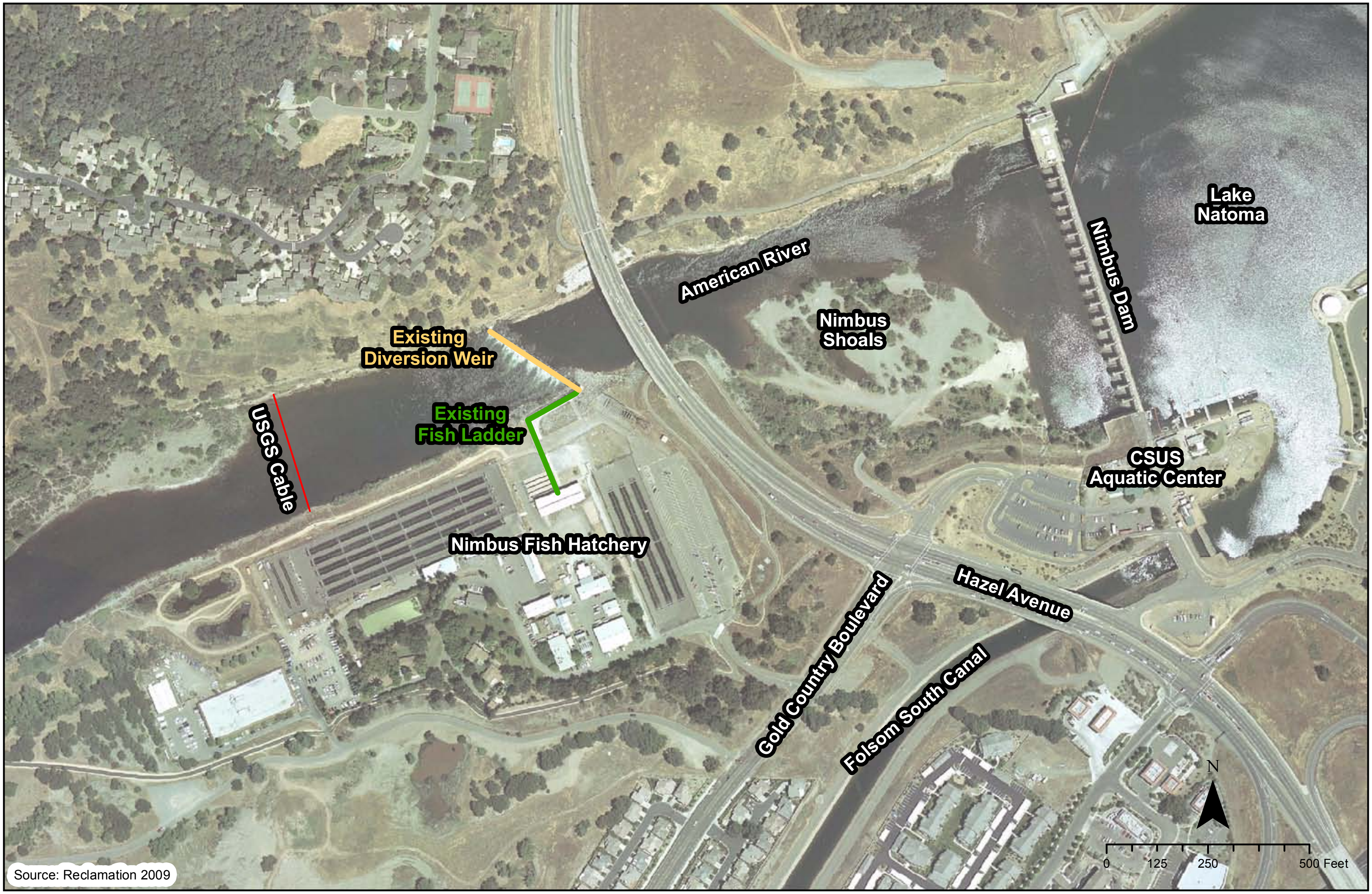


Project Location

Nimbus Hatchery Fish Passage Project

TETRA TECH

Figure 1-1



Legend

- Existing Diversion Weir
- Existing Fish Ladder
- USGS Cable

Project Area

Nimbus Hatchery Fish Passage Project

Figure 1-2

The Hatchery and fish diversion weir were constructed and became operational in 1955. Since then, much of the hatchery infrastructure has been modernized, but the weir and ladder system are largely unchanged. The weir structure is aging and shows signs of over 50 years of use. The weir foundation and piers are periodically damaged by significant winter river flows, requiring major repairs in 1963, 1982, 1986, and 1999. There are also operational and maintenance problems with the weir that could jeopardize adult fish collection and the Hatchery's ability to meet its mitigation obligations. Installation and maintenance of the weir require lowering river flows to levels that negatively affect steelhead, a protected species under the Endangered Species Act (ESA) and California Endangered Species Act (CESA). The weir design cannot handle flows over 5,000 cubic feet per second (cfs) and sometimes requires removal before sufficient numbers of adult fall-run chinook salmon can be collected. Worker safety during installation and removal and for routine cleaning is also a primary concern.

The most recent flood to significantly damage the weir foundation and river embankment next to the Hatchery occurred in January 1997. Reclamation consulted with the NMFS on potential impacts of the repair project, including continued weir repair and associated flow reductions on federally protected fish. The NMFS recommended that ". . . Reclamation and CDFG develop a long-term solution and a schedule for implementation to minimize flow fluctuations associated with the installation and removal of the Nimbus Fish Hatchery fish diversion weir racks and pickets by June 2000" (NMFS 1999).

Reclamation's efforts to find a lasting solution to problems with the weir began in the early 1990s. In 1996, Reclamation completed a concept study that described alternative designs for correcting the design deficiencies of the weir (Reclamation 1996). Subsequently, attention focused on repairing the damage to the weir foundation from a significant flood in 1997. On completion of the repair project in 1999, Reclamation convened an interagency interdisciplinary workshop to further develop the best ways of resolving the problem (Reclamation 1999a). Participants in this value analysis workshop considered a variety of potential solutions, as follows:

- Replace the weir foundation and use the existing fish screen assembly;
- Replace the weir with a solid foundation and a declined (downward sloping) bar rack on the downstream surface;
- Collect fish near the tailrace (power plant water channel) of Nimbus Dam and transport fish by truck to the Hatchery; and
- Collect fish near the tailrace of Nimbus Dam and transport fish to the Hatchery via a sluice (water channel).

Neither the concept study nor the value analysis workshop considered the passage of juvenile salmonids. At the time, spawning and rearing habitat upstream of the weir were considered minimal, and the selection of an alternative that replaced the structure was expected to meet the need to maintain a functional hatchery. Reclamation proceeded to advance a design that replaced the diversion weir with a similar in-river structure immediately upstream of the weir. However, toward the end of the design process, steelhead were formally listed as a threatened species under the ESA. In accordance with its obligations under the ESA, Reclamation initiated informal consultation with the NMFS on the replacement weir design. The NMFS requested that the weir design provide passage upstream of the weir to accommodate the threatened Central Valley evolutionary significant unit (ESU) of West Coast steelhead. Several design modifications were made to accommodate juvenile steelhead passage but were expected to have limited utility, given that the then-preferred alternative, a replacement weir, was designed to block fish.

Consequently, Reclamation revisited concepts for diverting salmon into the Hatchery and requested that the California Department of Water Resources (DWR) Fish Passage Program provide review and comment on Reclamation's replacement weir design. The DWR suggested extending the fish ladder to the stilling basin downstream of the Nimbus Dam and using the dam as the diversion weir to direct salmon into the ladder. This suggestion was similar to two recommendations in the concept study, except that it used a fish ladder to transport the fish to the Hatchery, rather than using trucks or a sluiceway. After reviewing this alternative, Reclamation prepared a conceptual design for a fish ladder from the Hatchery to the south side of the Nimbus Dam stilling basin, in the Nimbus Shoals area. This design is represented in this document as Alternative 1.

Reclamation has also continued to advance a design for a replacement weir. This design is represented in this document as Alternative 2.

Reclamation addressed alternative solutions to the problems with the weir in a series of planning studies between 1996 and 2003. In December 2003 Reclamation held two public meetings in Rancho Cordova, California, to document questions from the community, to identify issues and concerns, and to solicit suggestions on the weir replacement. These meetings and the issues that were raised are summarized in Appendix A.

In 2006, Reclamation convened a Project Alternatives Solutions Study (PASS) to assist in refining alternatives (Reclamation 2006a). The PASS workshops included input from the DWR Fish Passage Improvement Program, the NMFS, the CDFG, and the California Department of Parks and Recreation (CDPR).

During discussions with government agencies and the general public, Reclamation noted the following issues and concerns:

- Adequacy of attraction flows at the fish ladder entrance;
- Optimizing the health of fish in transit through the fish ladder;
- Public and worker safety;
- Hatchery operations independent of dam operations;

- Hydraulic constriction upstream of and at the Hazel Avenue Bridge;
- Year-round juvenile steelhead access between the existing diversion weir and Nimbus Dam;
- Fishing access and regulations downstream of Nimbus Dam;
- Hydropower production at Nimbus Dam;
- The replacement weir's ability to withstand flood releases of up to 160,000 cfs without significant damage;
- Illegal fishing, boating, and gathering on Nimbus Shoals;
- Continued fishing opportunities between the existing weir and Nimbus Dam;
- Boating opportunities between the existing weir and Nimbus Shoals;
- Operation, maintenance, and replacement costs of any new facilities; and
- Restoration of riverine habitat between the existing weir and Nimbus Dam.

Reclamation has addressed and continues to address these issues and concerns through the identification and refinement of project alternatives, the design of fish passage structures, continued outreach to agencies and the public, and preparation of this EIS/EIR.

Reclamation prepared an administrative draft environmental assessment (EA) in 2006 (Reclamation 2006b), which never reached the public draft EA stage. The administrative draft EA contained an extended fish ladder alternative, a weir replacement alternative, and a no action alternative. Due to public and agency interest in the project, potential changes to CDFG fishing regulations, and the need for further analysis of potential project impacts, Reclamation decided to begin the EIS/EIR process.

1.5 EIS/EIR Process

Reclamation formally announced the EIS/EIR process with the publication of the notice of intent (NOI) in the *Federal Register* on April 7, 2009, and the CDFG announced the release of the notice of preparation (NOP) on April 9, 2009. (As mentioned previously, Reclamation is the NEPA lead agency, and the CDFG is the CEQA lead agency for this project.)

The lead agencies provide opportunities for the public to participate in the NEPA/CEQA environmental analysis process, to promote open communication and better decision making. All persons and organizations having a potential interest in the proposed action and alternatives, including minority, low-income, and Native American groups, are urged to participate in the NEPA/CEQA process. Formal opportunities for public involvement are initiated by the publication of the NOI and NOP, the draft EIS/EIR notice of availability (NOA) and notice of completion (NOC), and the final EIS/EIR NOA and NOC.

At the initiation of an EIS/EIR, the lead agencies issue an NOI and an NOP to start the project scoping period. The NOI, which is required by NEPA, is published in the *Federal Register*; the NOP, which is required by CEQA, is submitted to the State Clearinghouse. Notices of public scoping meetings are published in local newspapers and are mailed to interested persons and organizations, including any potentially affected minority and low-income groups.

Following internal review, the lead agencies finalize and issue a draft EIS/EIR. Reclamation and the US Environmental Protection Agency (EPA) publish individual NOAs in the *Federal Register,* in accordance with NEPA, and an NOC is submitted to the State Clearinghouse, in accordance with CEQA. Notices are also published in local newspapers. In addition, copies of the draft EIS/EIR are mailed to individuals, organizations, Native American tribes, and government agencies that request copies. Notices of public meetings on the draft EIS/EIR are published in local newspapers and are mailed to interested persons and organizations, including any potentially affected minority and low-income groups.

After responding to public comments on the draft EIS/EIR, the lead agencies issue a final EIS/EIR. Both EPA and Reclamation publish NOAs in the *Federal Register,* and an NOC is submitted to the State Clearinghouse. Notices are published in local newspapers, and copies of the final EIS/EIR are provided to local libraries and are mailed to those who request copies.

Following completion of the final EIS/EIR, the lead agencies document their selection of an alternative and mitigation measures for implementation in the record of decision (ROD, under NEPA) and a notice of determination (NOD, under CEQA).

1.6 Public and Agency Involvement

Reclamation published an NOI in the *Federal Register* on April 7, 2009, and the CDFG issued an NOP on April 9, 2009. This marked the start of a 45-day scoping period that began on April 7, 2009, and ended on May 28, 2009. Information about the public scoping meetings was also published in the *Folsom Telegraph* on April 15, 2009, in the *Sacramento Bee* on April 17, 2009, and in the *Grapevine Independent* on April 17, 2009. A press release was issued on April 20, 2009, and a postcard announcing the public scoping meetings was mailed to approximately 164 potentially interested parties.

During the scoping period, the lead agencies hosted two public scoping meetings to share information about the project alternatives and to obtain input from the community. The meetings took place at the California State University, Sacramento (CSUS) Aquatic Center in Gold River, California, on April 30, 2009, from 1:00 PM to 3:00 PM and from 6:30 PM to 8:30 PM. A combined total of 30 community and agency staff members attended the two meetings. Verbal comments were answered during the meetings, and the lead agencies received four written comments during the scoping period from the following: California Department of Boating and Waterways, Horseshoe Bar Fish and Game Preserve, Inc., the CDPR, and the EPA. The comments are detailed in the scoping meetings summary report in Appendix B (Reclamation and CDFG 2009) and are summarized below.

Most of the discussion at the scoping meetings focused on the extended fish ladder alternative (Alternative 1) since its implementation would provide new opportunities for access and use of the river and integration with habitat restoration efforts. Few comments were raised about the proposed changes to fishing regulations that are part of Alternative 1. The main topics of discussion were as follows:

- Habitat and fisheries protection, including the fish passageway design, river flows, habitat restoration, and illegal fishing;
- Fishing, boating, and recreation, including boating access and safety, fishing closures, a potential whitewater course, the bike trail, and the Folsom State Recreation Area management plan;
- Safety and public access, including parking and fish viewing opportunities;
- Design and construction, including geology, hydrology, and river flows; and
- The invasive New Zealand mudsnail (*Potamopyrgus antipodarum;* NZMS), including the impacts of potential contamination of the Hatchery.

Specifically, participants asked the lead agencies to consider the following in the draft EIS/EIR:

- Restoring habitat under all alternatives;
- Contending with the increase in illegal fishing under Alternative 1;
- Installing landmarks to delineate the fishing closure areas under all alternatives;
- Maintaining the security of Nimbus Dam and power plant under all alternatives;
- Providing boating launching access at Nimbus Shoals under Alternative 1;
- Reviewing boating safety under Alternative 2 and the No Action Alternative;
- Reviewing the loss of an opportunity to create a whitewater course under Alternative 1;

- Leaving a portion of the weir in place to create a whitewater play structure under Alternative 1;
- Continuing to provide public access to Nimbus Shoals under all alternatives;
- Coordinating with the new Folsom State Recreation Area plan, particularly with regard to access issues and parking under all alternatives;
- Minimizing impacts on the bike trail under all alternatives;
- Providing fish viewing opportunities under Alternative 1;
- Providing additional parking under all alternatives;
- Operating any in-river structures during flood flows under all alternatives;
- Addressing site geology and hydrology;
- Restricting the spread of the NZMS and contamination of the Hatcheries under all alternatives;
- Creating a defined parking area at Nimbus Shoals;
- Constructing a fence along the north side of the river south of the bike trail to prevent illegal fishing access under Alternative 1C; and
- Complying with all federal regulations, including the Clean Water Act, Safe Drinking Water Act, and the ESA.

In April 2009, Reclamation launched a Nimbus Hatchery Fish Passage Project Web site to serve as a clearinghouse for project information during the EIS/EIR process. The Web site, http://www.usbr.gov/mp/ccao/hatchery/, provides background information about the project, a project timeline, maps and photos of the planning area, and copies of public documents, such as the NOI and this draft EIS/EIR. The site also provides contact information for submitting comments and for obtaining further information about the project.

1.7 Required Permits and Approvals

As the lead agencies, Reclamation and the CDFG are responsible for documenting compliance with relevant federal and state environmental laws and regulations, as well as permit requirements needed to implement the chosen alternative. Table 1-1 lists agencies and their permit and authorizing responsibilities. Coordination with the issuing agencies is discussed below as appropriate.

Table 1-1. Required Permits and Approvals

Permits and Approvals	Agency
Section 401, Clean Water Act (CWA) water quality certification	Central Valley Regional Water Quality Control Board (CVRWQCB)
Section 402, National Pollution Discharge Elimination System, general construction permit	State Water Resources Control Board (SWRCB)
Section 404, CWA	US Army Corps of Engineers (USACE)
Section 1602, Streambed Alteration Agreement	CDFG
Porter-Cologne Water Quality Control Act consultation	CVRWQCB
ESA Section 7 consultation	USFWS, NMFS
EFH consultation; Sections 305(b)(1)(D) and 305(b)(2-4) of the Magnuson-Stevens Fishery Conservation and Management Act	NMFS
CESA consultation	CDFG
Section 106, National Historic Preservation Act consultation	California State Historic Preservation Office (SHPO)
National Register of Historic Places evaluation	SHPO

1.7.1 Federal Legal Authorities

NEPA (42 USC, Section 4321 et seq.)

Under NEPA, federal agencies must consider the environmental consequences of proposed major actions. The spirit and intent of NEPA is to protect and enhance the environment through well-informed federal decisions, based on sound science. NEPA is premised on the assumption that providing timely information to the decision maker and the public about the potential environmental consequences of proposed actions would improve the quality of federal decisions. Thus, the NEPA process includes the systematic interdisciplinary evaluation of potential environmental consequences expected to result from implementing a proposed action. The CEQ sets forth regulations implementing NEPA. This document is intended to fulfill the requirements of NEPA and the CEQ regulations.

Clean Water Act of 1972 (33 USC, Section 1251 et seq.) and Implementing Regulations (33 CFR, Parts 320-330, 335-338, and 40 CFR, Parts 104-140, 230-233, and 401-471)

The CWA, Public Law (PL) 92-500, employs a variety of regulatory and nonregulatory tools to protect surface water quality in the US. Permits for the proposed project are required under Sections 401, 402, and 404 of the CWA. Section 404 establishes a program to regulate the discharge of dredge and fill material into waters of the US, including wetlands. Because the proposed project would result in work below the ordinary high water mark (OHWM) of the lower American River, which is a jurisdictional water of the US, and because they may fill jurisdictional wetlands and other waters of the US next to the river, a Section 404 permit from the USACE would be required. The EPA has veto power over USACE Section 404 permit decisions, and the USFWS and the NMFS have consultation rights. Section 401 requires that anyone who wishes to obtain a Section 404 permit must first obtain a state water quality certification to ensure that the proposed project would comply with state water quality standards.

Section 402 establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate point source discharges of pollutants into waters of the US. An NPDES permit sets specific discharge limits, establishes monitoring and reporting requirements, and defines any special conditions. In California, the NPDES permit program is administered by the SWRCB.

Rivers and Harbors Act (33 USC, Section 403)

Section 10 of the Rivers and Harbors Act of 1899 regulates alteration of and prohibits unauthorized obstruction of navigable waters of the United States. A Section 10 Permit is required for constructing in, over, or under, for excavating materials from, or for depositing materials into navigable waters of the United States. The lower American River is not considered a navigable waterway in the project area. A permit is not required for this project.

Clean Air Act (42 USC, Section 7401 et seq.)

The principal federal law protecting air quality is the Clean Air Act (CAA), which is enforced by the EPA. The CAA regulates air emissions from area, stationary, and mobile sources. Under this law, the EPA establishes National Ambient Air Quality Standards (NAAQS) for each state in order to protect public health and the environment (EPA 2008). The CAA requires areas with unhealthy levels of ozone, carbon monoxide, nitrogen oxide, sulfur oxide, and inhalable particulate matter to develop State Implementation Plans, describing how they will attain NAAQS in accordance with 40 CFR, 52.220. State Implementation Plans are not single documents but a compilation of new and previously submitted plans, programs, district rules, state regulations, and federal controls (California Air Resources Board 2003). Since the proposed project would involve ground-disturbing activities and the use of heavy construction equipment that generates emissions, coordination with the Sacramento Metropolitan Air Quality Management District (SMAQMD) is required. This EIS/EIR contains analysis and mitigation measures aimed at fulfilling SMAQMD requirements.

Federal ESA (16 USC, Sections 1531–1544) and Implementing Regulations (50 CFR, Parts 17, 401-424, and 450-453)

Under the ESA, all federal agencies, in consultation with the Secretary of the Interior, must take all necessary precautions to ensure that their actions do not jeopardize federally listed endangered or threatened species or destroy or degrade their habitats. The ESA provides a program for conserving threatened and endangered plants and animals and the habitats in which they are found. It is designed to protect critically imperiled species from extinction due to "the consequences of economic growth and development untempered by adequate concern and conservation." The lead agencies will consult with the NMFS and USFWS and will prepare a biological assessment.

Federal Migratory Bird Treaty Act (MBTA) of 1918 and Amendments (16 USC, Sections 703–712)

The MBTA prohibits the take, harm, or trade of any migratory bird species and requires that an agency must have a policy in place to prevent harm to such species as a result of that agency's actions. The USFWS is the agency charged with administering and enforcing the MBTA. A 1972 amendment to the act included owls, hawks, and other birds of prey. Measures intended to comply with the MBTA have been integrated into the proposed project.

Magnuson-Stevens Fishery Conservation and Management Act of 2006 (PL 94-265, as amended)

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. Among other provisions, such as annual catch limits, this legislation mandates the identification of "essential fish habitat," which is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity," for all managed species. Federal agencies consult with the NMFS on proposed actions that may adversely affect essential fish habitat. The Magnuson-Stevens Act states that consultation on essential fish habitat should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other federal statutes, such as NEPA, the FWCA, the CWA, and the ESA.

Central Valley Project Improvement Act of 1992 (CVPIA) (PL 102-575 Title 34)

The CVPIA amends previous authorizations of the California Central Valley Project. It includes fish and wildlife protection, restoration, and mitigation as project purposes, having equal priority with irrigation and domestic water supply uses, and fish and wildlife enhancement, having an equal priority with power generation. Fish and wildlife enhancement provisions of the CVPIA include dedicating 800,000 acre-feet of water to fish and wildlife annually, adopting special efforts to restore the anadromous fish population by 2002, establishing a habitat restoration and enhancement and land acquisition fund financed by water and power users, and providing that no new water contracts will be approved until fish and wildlife goals specified in the CVPIA are achieved.

Anadromous Fish Restoration Program

Section 3406(b)(1) of the CVPIA directs the Secretary of the Interior to develop and implement a program that makes "all reasonable efforts to at least double natural production of anadromous fish in California's Central Valley streams on a long-term, sustainable basis." The Anadromous Fish Restoration Program is the major program resulting from this regulatory directive. The program is co-implemented by the United States Fish and Wildlife Service and Reclamation.

CALFED Bay Delta Authority Act of 2003

The California Bay-Delta Authority Act of 2003 established the California Bay-Delta Authority as the governance structure of the California Bay-Delta Program (CALFED), a cooperative program of 25 state and federal agencies that work to improve the quality and reliability of California's water supplies, while restoring the Bay-Delta ecosystem. CALFED was initiated in 1995 to resolve water resources conflicts in the California Bay-Delta, which is the 1,153-square mile estuary at the confluence of the Sacramento and San Joaquin Rivers Delta and the San Francisco Bay. The lower American River is in the California Bay-Delta watershed.

National Historic Preservation Act of 1966 (NHPA) (16 USC, Sections 470-470x-6)

The Section 106 process of the NHPA requires that federal agencies consider the effects of their undertakings on historic properties. Each federal agency must establish a preservation program for identifying, evaluating, and protecting properties under its ownership or control that are eligible for listing on the National Register of Historic Places (NRHP). In the Section 106 process, a federal agency must identify historic properties that may be affected by its actions, must evaluate the proposed action's effects, and then must explore ways to avoid or mitigate those effects.

Rehabilitation Act of 1973 and Americans with Disabilities Act of 1990 and 1995 (29 USC, Section 794)

These laws require that access to federal facilities be provided for persons with disabilities.

Executive Order (EO) 11990: Protection of Wetlands (42 Federal Register [FR] 26961, May 25, 1977)

This order requires agencies to minimize destruction of wetlands when managing lands, when administering federal programs, or when undertaking construction. Agencies are also required to consider the effects of federal actions on the health and quality of wetlands. Measures intended to comply with EO 11990 have been integrated into the proposed project.

EO 11988: Floodplain Management (42 FR 26951, May 24, 1977)

This order requires federal agencies to regulate development in floodplains and preserves their natural and beneficial values. Measures to comply with EO 11988 have been integrated into the proposed project.

EO 11593: Protection and Enhancement of the Cultural Environment (36 FR 8921, January 15, 1971)

This order requires federal agencies to inventory historic properties on federal lands and to document historic properties altered or demolished through federal action.

EO 13112: Invasive Species (64 FR 6183, February 3, 1999)

This order directs federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. To do this, the EO established the National Invasive Species Council.

Federal Noxious and Invasive Weed Laws

Federal laws pertaining to the control of noxious and invasive weeds include the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 as amended (16 USC, 4701, et seq.), the Lacey Act as amended (18 USC, 42), the Federal Plant Pest Act (7 USC, 150aa et seq.), the Federal Noxious Weed Act of 1974, as amended by the Food, Agriculture, Conservation, and Trade Act of 1990 (Section 1453, “Management of Undesirable Plants on Federal Lands,” USC, 2801, et seq.), the Carlson-Fogey Act of 1968 (PL 90-583), and EO 13112, as noted above. The Bureau of Land Management and the US Department of Agriculture maintain lists of pest plants of economic or ecological concern. Measures to comply with these laws have been integrated into the project.

EO 12898: Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (59 FR 7629, February 11, 1994)

This order requires that federal agencies identify and address any disproportionately high and adverse human health or environmental effects of federal actions on minority and low-income populations and to ensure that federal actions do not directly or indirectly discriminate on the basis of race, color, or national origin.

Law Enforcement Authority: PL 107-69 (2001)

PL 107-69 allows Reclamation to enforce laws on its lands and facilities using other Department of the Interior agencies or by contracting with other federal, state, or local law enforcement organizations.

Coordination with the US Coast Guard

Because the proposed project involves the removal of an active weir in the lower American River, coordination with the US Coast Guard (USCG) is required. The USCG provides input into the USACE evaluation process for issuing permits related to fixed structures, in accordance with 33 USC, Section 403. The USACE will notify the USCG and will provide an opportunity to comment on permit applications, in accordance with Section 404 and USACE regulations at 33 CFR, Sections 320–331.

Wild and Scenic Rivers Act (16 USC, Sections 1271-1287)

Section 7 of the Wild and Scenic Rivers Act directs federal agencies to preserve the wild and scenic character of rivers protected under the act. The lower American River is a Wild and Scenic River, from the confluence with the Sacramento River to the Nimbus Dam, which includes the project area. Evaluation procedures under the direct and adverse effects standards from federally assisted projects inside the designated river are required under Section 7(a) of the act and in consultation with the National Park Service (NPS). Informal coordination with the NPS has been completed.

1.7.2 State and Local Legal Authorities

California Environmental Quality Act (Public Resource Code 21000 et seq.)

CEQA was closely modeled on NEPA and requires public agencies to consider and disclose to the public the environmental implications of proposed actions. CEQA applies to all discretionary activities that are proposed or approved by California public agencies, including state, regional, county, and local agencies, unless an exemption applies. Unlike NEPA, CEQA imposes an obligation to implement measures or project alternatives to mitigate significant adverse environmental effects, when feasible. When avoiding or mitigating environmental damage is not feasible, CEQA requires that agencies prepare a written statement of the overriding considerations that resulted in the approval of a project that would cause significant adverse effects on the environment. Under the direction of CEQA, the California Resources Agency has adopted regulations, known as the *Guidelines for Implementation of the CEQA* (CCR Title 14, Section 15000), which provide detailed procedures that agencies must follow to implement the law.

Streambed Alteration Agreement (Fish and Game Code, Section 1602)

Section 1602 states that a Streambed Alteration Agreement is required if the CDFG determines that a proposed project that would modify a river, stream, or lake could have a substantial adverse effect on fish and wildlife. The Streambed Alteration Agreement includes measures to protect fish and wildlife resources during the proposed project.

California Endangered Species Act (Fish and Game Code, Sections 2050, et seq.)

CESA operates in a similar fashion to the federal ESA but is administered by the CDFG. Certain species that are federally listed may not be listed on the CESA or may have different listing status.

Natural Community Conservation Planning Act (Fish and Game Code, Section 2800, et seq.)

The Natural Community Conservation Planning Act takes a broader approach to conservation than the CESA. The purpose of the act is to preserve species and their habitats at the ecosystem level, while accommodating compatible growth and development. In coordination with the CDFG, local agencies develop natural community conservation plans to fulfill the mission of the act. The project area is not included in an existing natural community conservation plans.

Protection and Management of Spawning Areas (Fish and Game Code, Section 1505)

CDFG manages, controls, and protects spawning areas within state-owned lands to the extent necessary to protect fishlife in these areas, with limited exceptions, including lands on the lower American River from the Nimbus Dam to a point one mile downstream of Arden Way.

Conservation of Wildlife Resources (Fish and Game Code, Section 1800, et seq.)

This portion of the Fish and Game Code makes it the policy of the State of California to maintain and perpetuate wildlife and habitat and to provide for diversified beneficial uses of wildlife, including sport hunting, as appropriate. This portion of the code acknowledges the CDFG as trustee for the state's fish and wildlife resources and grants it jurisdiction over the conservation, protection, and management fish, wildlife, native plants, and habitat necessary to sustain populations of these species.

Native Plant Protection (Fish and Game Code, Section 1900, et seq.)

In order to protect, preserve, and enhance endangered or rare native plants, the CDFG designates endangered or rare native plant species (by action of the Commission following a public hearing) and adopts regulations to govern the take of such species. To enforce these regulations, authorized agents may make arrests without a warrant. The provisions of this chapter generally exclude emergency work, agriculture, timber harvesting, mining assessment, and clearing of public and private facilities, such as roads, canals, rights-of-way, and utility corridors.

Hatchery Specifications (Fish and Game Code, Section 5938-5939)

When a hatchery is built as mitigation for a dam that blocks fish passage, the hatchery, traps, and other equipment necessary to operate the hatchery should not exceed the size necessary to supply the river with a reasonable number of fish.

Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988 (Fish and Game Code, Section 6900, et seq.)

This act mandated the CDFG to develop a plan and program to significantly increase the natural production of salmon, steelhead, and other anadromous fishes by 2000 and states that the protection of, and increase in, the naturally spawning salmon and steelhead trout of the state must be accomplished primarily through improving stream habitat. The act states that it is the policy of the State of California that existing natural anadromous fish habitat should not be diminished further without offsetting the impacts of the lost habitat.

Trout and Steelhead Conservation and Management Planning Act of 1979 (Fish and Game Code, Section 1725, et seq.)

As a continuation and perpetuation of the CDFG's existing wild trout program, this act directs the CDFG to inventory all California trout streams and lakes and to determine the most suitable angling regulations for each and the appropriate management approach (for example, a wild trout fishery or planting trout).

Water Pollution (Fish and Game Code, Section 5650-5652)

It is unlawful to pollute waters of the state with any substance or material deleterious to fish, plants, or birds, with limited exceptions for authorized releases at waters of the state. In addition, it is unlawful to abandon or dispose of garbage, motor vehicles, motor vehicle parts, or dead birds or mammals within 150 feet of the ordinary high-water mark of waters of the state. The provisions of this section must be enforced by all law enforcement officers of the state, and appropriate civil penalties may be imposed.

Sacramento-San Joaquin Valley Wetlands Mitigation Bank Act of 1993 (Fish and Game Code, Section 1775, et seq.)

This chapter establishes a nonexclusive alternative to other lawful methods of mitigating project impacts on wetlands and maintaining and increasing wetlands acreage and habitat values, generally by laying the foundation for a mitigation banking process. The purpose of this act is to ensure that no net loss of wetland acreage or habitat values within the Sacramento-San Joaquin Valley occurs as a result of fill permit activities, in accordance with Section 404 of the Clean Water Act (33 USC, Section 1344, et seq.).

Porter-Cologne Water Quality Control Act of 1970 (California Water Code, Section 13000 et seq.)

In 1967, the Porter-Cologne Act established the SWRCB and nine regional water quality control boards as the primary state agencies with regulatory authority over California water quality and appropriative surface water rights allocations. The SWRCB administers the Porter-Cologne Act, which provides the authority to establish Water Quality Control Plans (WQCP) that are reviewed and revised periodically. The Porter-Cologne Act also provides the SWRCB with the authority to establish statewide plans. The nine RWQCBs carry out SWRCB policies and procedures throughout the state, along with sections of the CWA, administered by the EPA, including the NPDES permitting process for point source discharges and the CWA Section 303 water quality standards program. WQCPs, also known as basin plans, designate beneficial uses for specific surface water and groundwater resources and establish water quality objectives to protect those uses. These plans can be developed at the SWRCB or the RWQCB level. RWQCBs issue waste discharge requirements for the major point-source waste dischargers, such as municipal wastewater treatment plants and industrial facilities. In acting on water rights applications, the SWRCB may establish terms and conditions in a permit to carry out WQCPs.

Coordination with State Lands Commission

The proposed project would affect the lower American River, the land under which is owned by the State Lands Commission, which may require a lease to implement the proposed project.

Encroachment Permit from the California Reclamation Board

The proposed project would not require an encroachment permit from the Reclamation Board.

American River Flood Control District

Coordination with the American River Flood Control District has taken place, and no permit is required.

City of Sacramento Department of Environmental Review and Assessment

The City of Sacramento Department of Environmental Review and Assessment (DERA) is the lead agency on the Hazel Avenue Bridge Widening Project, which affects the area of the proposed project. It is anticipated that the Hazel Avenue Bridge Widening Project will be completed prior to implementation of the proposed project. Reclamation has coordinated with DERA and environmental protection measures are compatible.

2. Description of the Proposed Action and Alternatives

This section is a description of the components, timing, and phasing of the proposed project alternatives. The EIS/EIR is an evaluation of two options for implementing Alternative 1, Alternative 2, and the No Action Alternative, which is prescribed by the CEQ and serves as a benchmark against which project alternatives can be evaluated; it is described in Section 2.5.

2.1 Introduction

Two approaches to meeting the purpose and need for the project are evaluated in the EIS/EIR: modifying the fish passageway by extending the ladder to Nimbus Dam (Alternative 1) and replacing the weir structure (Alternative 2).

Alternative 1 involves the construction of a fish passageway from the Hatchery to the stilling basin downstream of Nimbus Dam and removing the diversion weir. Nimbus Dam would function as the upstream barrier to fish migration. Two implementation options for Alternative 1—Alternative 1A and Alternative 1C—are being evaluated because the CDFG is considering modifying fishing closure regulations. Alternative 1A is consistent with Fish and Game Code and would not require that fishing regulations be modified. Alternative 1C requires a modification of fishing regulations to be approved by the Fish and Game Commission. The commission regulates the taking and possession of fish and other animals. The commission must consider and adopt new regulations or changes to existing regulations at no fewer than three meetings annually (Fish and Game Code, Section 204, et seq.). Reclamation has identified Alternative 1 as the preferred alternative.

Alternative 2 involves replacing the weir with a new weir immediately upstream. This alternative would add additional entrances to the fish ladder but would continue to use most of the ladder. The structure would be permanent, would not require annual installation or flow reductions, and would include a six-bay bypass that would allow structure maintenance without reducing river flows.

The No Action Alternative would continue using the diversion weir. Annual operations and maintenance and river flow reductions would continue to be required.

The four alternatives under consideration are as follows:

- *Alternative 1A—Construction of a modified fish passageway and removal of the diversion weir*. Fishing closures would apply all year within a radius of 250 feet of the modified fish passageway entrance and the existing Hatchery fishway outfall, based on existing fishing regulation Title 14 CCR, 2.35. The river is closed during spawning season, from September 15 to December 31, from the Hazel Avenue Bridge to the USGS gaging station cable crossing, in accordance with Title 14 CCR, 7.50(b)(5)(B). These closures would be consistent with Fish and Game code and would not require any discretionary action by the Fish and Game Commission.

- *Alternative 1C—Construction of a modified fish passageway and removal of the diversion weir.* The Fish and Game Commission would implement a new fishing regulation to close fishing year-round between Nimbus Dam and the USGS gaging station cable crossing. New fishing regulations and closures would be at the discretion of the Fish and Game Commission.

- *Alternative 2—Replacement of the diversion weir with a six-bay bypass and a denil fish ladder.* (A denil fish ladder is a roughened ramp that is smaller and requires less flow than a pool and weir-style fish ladder.) Existing fishing closures within 250 feet of the fish ladder entrance and outfall would remain in effect.

- *No Action Alternative*—Continuance of existing conditions.

One additional alternative, Alternative 1B, was previously considered and was presented at the public scoping meetings. Alternative 1B is no longer being considered by Reclamation and CDFG, but it is described in Section 2.7, Alternatives Considered but Eliminated from Detailed Evaluation.

2.2 Existing Conditions

Fish Collection System

The current system for collecting fish for the Hatchery consists of a fish weir (Figure 2-1) and ladder (Figure 2-2). The weir prevents adult chinook salmon from continuing upstream and diverts them into the fish ladder and Hatchery. Those fish that do not enter the Hatchery either drop back into the river to suitable habitat and spawn or elude the weir and congregate in the Nimbus Dam stilling basin (between the weir and the Nimbus Dam). The weir superstructure is installed from approximately mid-September until mid-December, when the Hatchery has taken all the salmon required for the season. High river flows necessitate the temporary removal of the weir superstructure to prevent structure damage.

Figure 2-1. Existing diversion weir with superstructure

Figure 2-2. Existing fish ladder

The 326-foot-long weir is approximately 0.25 mile downstream of the Nimbus Dam on the lower American River. The entire structure is angled at about 55 degrees from the center line of the river, with the north side of the structure farther downstream. The structure has eight vertical concrete piers, located every 30 feet across the river, and two riverbank abutments. The weir foundation, which is between the piers, consists of sheet piles, steel H-beams, and rocks, with a crest elevation of 77.5 feet above mean sea level (msl). The foundation of the weir and its piers are permanent, and the superstructure is installed each fall.

The weir superstructure includes a support frame, pickets (vertically aligned cylindrical steel bars), and a walkway. The weir becomes operational when the support frame and walkway are installed and the pickets are attached and seated into the upstream bottom edge of the support frame. Sandbags are placed as needed in the larger gaps between the bottom support frame/pickets and the rock foundation.

Reclamation and Hatchery personnel must enter the water to install and remove the weir superstructure and to make repairs. River flows must be lowered to approximately 1,000 to 1,500 cfs for safety when personnel are working in the water. River flows must be lowered even farther if major repairs are needed and heavy equipment must be put in the water or if problems are encountered during installation. The duration of the flow reductions has ranged from less than one hour, under the best conditions, to five days, when significant winter flows have scoured the foundation of the structure and major repairs were required. River flow reductions are not desirable as they negatively impact the availability of habitat in the river used by Central Valley steelhead trout by reducing the amount of cover from predation and increasing fish densities in the remaining habitat, thus increasing the potential for disease to spread. During the peak spawning period for Central Valley steelhead trout, the dropping of flows has the potential to dewater redds and consequently impact in-river production. Lowering flows can also degrade habitat by raising temperatures and increasing turbidity (NMFS 2009).

The weir superstructure is vulnerable to damage at flows over 5,000 cfs. The pickets must be removed if releases of 5,000 cfs are anticipated, the racks must be removed if releases of 10,000 cfs are anticipated, and the walkway is removed if releases of 15,000 cfs are anticipated. When flows that may result in damage are anticipated, the entire weir superstructure is usually completely, rather than incrementally, removed.

Historically, following high floods, the weir's foundation has been damaged (Figure 2-3) and major repairs have been needed. This has included placing significant amounts of rock and cobble in voids in the foundation, which requires lowering the flow in the river. Damage to the fish ladder entrance and loss of piers has also occurred in past floods. A significant flood would continue to cause variable levels of damage, which would require repairing and eventually replacing the weir. Historic records indicate damage occurs at flows in excess of approximately 50,000 cfs.

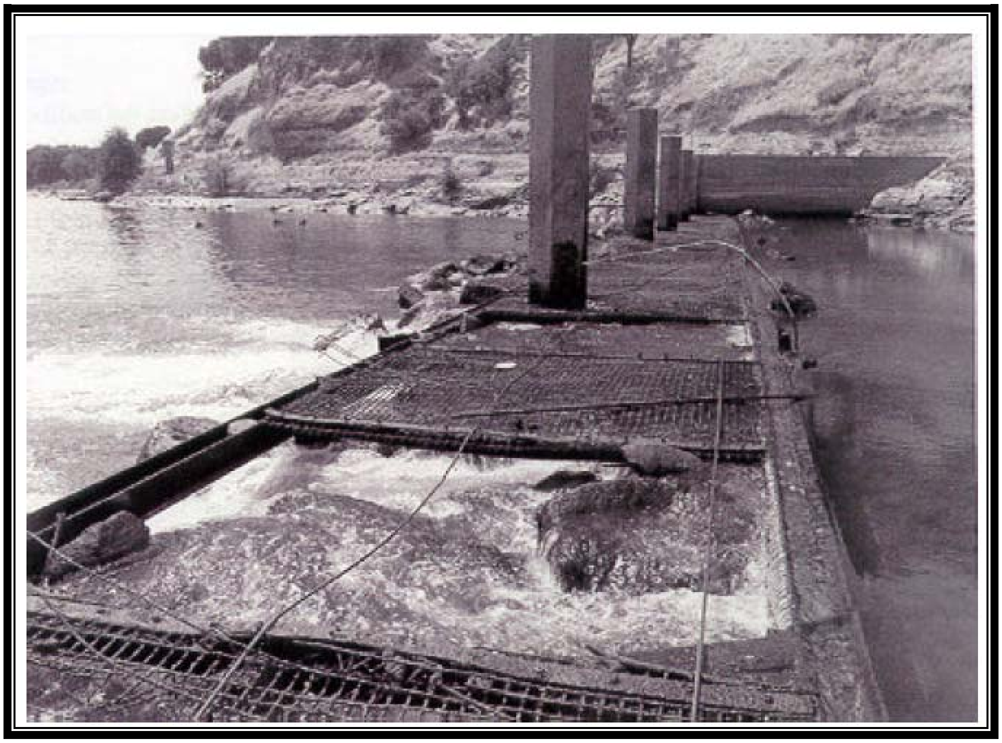


Figure 2-3. Damaged weir foundation

Daily, while the superstructure is in place, Hatchery personnel clean dead fish and debris, primarily common trash, from the diversion weir. They remove, account for, and tag dead salmon that wash up on the weir before tossing them back into the river. This tagging is necessary so that the fish are not counted again by the carcass survey crews working downstream of the weir. Only salmon with an adipose clip (a mark used to identify fish) are taken back to the Hatchery for processing. The larger and readily accessible debris is also removed and disposed of; the rest of the debris is allowed to pass downstream by raising the weir pickets, then reseating them in the bottom support frame.

Cleaning and maintaining the weir presents safety hazards to workers. Although safety measures are in place, there is some inherent risk from working on the weir and in the river. Workers access the weir via a 3.5-foot-wide platform and dislodge dead fish and debris in the weir superstructure using a hook. Workers may fall in the river or become injured from slips, trips, and falls on the platform. Workers often work in the rain or other inclement weather, which increases stress and the potential for accidents.

In addition, the weir is a boating hazard. Although boating is not allowed by Sacramento County ordinance between the weir and the Nimbus Dam, some boats are launched in this area and may become entrained on the weir or impaled on the piers. As part of the 1999 foundation repair, a layer of one- to three-foot riprap and six- to 12-inch river rock was placed in the river from the weir to a location approximately 25 feet upstream. The finished elevation is about 77.5 feet msl at the diversion weir and about 70 feet msl 25 feet upstream. The thalweg, or line of maximum depth and velocity of the river, is approximately 65 feet msl upstream and downstream of the weir.

The south bank of the river is armored with riprap from the upstream side of the Hazel Avenue Bridge to a point 1,500 feet downstream.

The fish ladder is approximately 260 feet long and nine feet wide, is made of concrete, and has a pool and weir design. Vertical barriers separate a series of pools of different elevations, similar to the steps on a staircase. The fish ladder steps are a series of one-foot drops, with an overall gradient of 8.3 percent. The pools and drops are created using dividers called flashboards, located about 12 feet apart. Normal operating flow in the fish ladder is 20 to 25 cfs. A manually operated pipe gate where the fish ladder meets the river controls the number of chinook salmon that enter the fish ladder.

The fish ladder is opened when it is likely that water temperatures in the Hatchery can be maintained at approximately 60 degrees Fahrenheit (°F) or lower. This usually occurs in the first two weeks of November. The temperature of the water entering the Hatchery is the same as that released from Nimbus Dam.

The Hatchery stops taking chinook salmon for spawning in mid- to late-December, and the weir superstructure is removed no later than early January. Weir removal generally does not require reductions in river flows. Steelhead enter the fish ladder from mid-December through April without the weir in place.

The fish ladder is cleaned shortly after it is closed in the spring. Any required maintenance of the fish ladder and weir is completed before the weir is reinstalled in the fall.

Nimbus Shoals

The area between Hazel Avenue and the Nimbus Dam is known as Nimbus Shoals and is open to the public from 6:00 AM to 9:00 PM during the summer and from 7:00 AM to 7:00 PM during the winter. The area is heavily used by anglers. Vehicles are not restricted in the Shoals area, and anglers can drive to the edge of the river and fish from their vehicles, which is attractive because it eliminates the need to haul gear. A portable restroom is the only public facility in the Shoals area.

Boating of any kind is not allowed by county ordinance between the weir and the Nimbus Dam, primarily to ensure public safety. Although boating is not allowed, some boats are launched in this area and may become entrained on the weir or dashed against the piers.

Recreational use of Nimbus Shoals contributes to water quality degradation of surface waters. Anglers have deposited lead sinkers on the apron of the power plant outfall and in the river; contamination of downstream waters is minimal due to the large size of the sinkers, which limits their mobility. Erosion from vehicles on the shoals likely results in siltation in surface waters. Additionally, drivers park their vehicles near the river’s edge, increasing the potential for fluids to leak and degrade surface water quality. Off-road vehicles are also used on the Shoals, contributing to erosion problems, particularly on the embankment.

There is a risk of flooding at Nimbus Shoals. From time to time, the amount of water released from Nimbus Dam is sufficient to inundate the low-lying Nimbus Shoals area. Although a warning siren is sounded before such releases, recreationists at Nimbus Shoals do not always vacate the area. Vehicles could be damaged or destroyed and vehicle occupants could be injured or killed if vehicles parked at Nimbus Shoals are not moved promptly when the warning siren sounds.

Other issues associated with visitor use of the Shoals include trash accumulation, vandalism, and vehicle break-ins.

Operations and maintenance efforts at the Shoals are minimal and primarily include trash removal and maintenance of the portable toilets. Law enforcement needs arise from vandalism, vehicle break-ins, and the use of illegal fishing techniques.

Surrounding Area

The Nimbus Fish Hatchery is uniquely situated in the lower American River corridor, in a major metropolitan area. The American River Parkway and its associated biking and hiking trails lie immediately downstream. The Lake Natoma State Recreation Area and the CSUS Aquatic Center lie immediately upstream. The Hatchery itself and the visitor center are attractions that provide interpretive opportunities for many school children, local citizens, and other visitors. The Hatchery is open to the public daily between 10:00 AM and 3:00 PM.

The parking lot at the Hatchery contains about 170 parking spaces and provides one of the last remaining free parking opportunities on the entire lower American River corridor. In addition to providing parking for visitors to the Hatchery, the public uses it for recreation and for accessing the American River Parkway bike trail, Nimbus Shoals, and the American River within the Hatchery and adjacent parkway. The Hatchery parking area is also one of the sites of the three-day Salmon Festival, held in October, which frequently attracts 20,000 visitors, although the event was cancelled in 2009. Over 90,000 people visited the Hatchery between July 2007 and June 2008 (CDFG 2008b).

The American River bike trail (officially named the Jedediah Smith Memorial Trail) is a paved multiuse pathway that extends from downtown Sacramento to Beal's Point at Folsom Lake, north of Folsom. The trail is 32 miles (51 kilometers) long, and is used as a major recreation destination and a commuter artery for cyclists. The trail is considered one of the longest paved purpose-built bike trails in the country. It extends for approximately 2,600 feet along a section of the southern border of the project area. The section of trail that extends beneath the Hazel Avenue Bridge, between the entrance road to the Hatchery and the entrance into Nimbus Shoals, is managed and maintained by the County of Sacramento. The remaining section extending from the entrance to Nimbus Shoals to the CSUS Aquatic Center parking lot is managed and maintained by California State Parks (Robinson 2010).

Operation of the Hatchery has no effect upstream of the weir to Nimbus Dam, other than the backwater effect of its foundation.

The Nimbus Dam includes a hydroelectric power plant. The equipment and penstocks (water channel) for the power plant are on the north side of the dam. All flows up to 5,000 cfs pass through the power plant to ensure maximum power generation. Fencing surrounds the power plant equipment and dam and restricts access. Downstream of the power plant, anglers access the north abutment of the dam through a hole in the fence to access fish attracted to flows from the plant outfall.

Fisheries and Fishing Regulations

The lower American River is open to fishing all year, from the Nimbus Dam to the Hazel Avenue Bridge, in accordance with Title 14 CCR, Section 7.50(b)(5)(A). The river is open to fishing from January 1 to September 14 from the Hazel Avenue Bridge to the USGS gaging station cable crossing and is closed from September 15 to December 31 during spawning season, in accordance with Title 14 CCR, 7.50(b)(5)(B). The USGS gaging station cable crosses the river approximately 900 feet downstream of the diversion weir. Downstream of the project area, the river is open to fishing from January 1 to October 31, from the USGS gaging station cable to the Sacramento Municipal Utility District (SMUD) power line crossing at the south-west boundary of Ancil Hoffman Park (CDFG 2008c).

In addition to the seasonal closure, the river is closed to fishing all year within a radius of 250 feet of the Hatchery spawning building outfall (discharge pipe) and fish ladder entrance, in accordance with fishing regulation Title 14 CCR, 2.35, which states that no fish may be taken within 250 feet of any fishway, egg-taking station, dam, or weir or rack that has a fishway or egg-taking station. An outfall approximately 250 feet downstream of the weir releases water from the spawning/egg-taking building and is used to return spawned steelhead to the river. The outfall may or may not be submerged, depending on river height. Current fishing closures are shown in Figure 2-4.

Illegal fishing, species conservation, and invasive species concern the integrity of the fishery. Chinook salmon and steelhead are protected under both the federal and state ESAs. Nimbus Shoals, the area between Nimbus Dam and the Hazel Avenue Bridge, has one of the highest citation issue rates for illegal salmon take in northern California (Lucero 2009). Adult chinook salmon congregate in the project area in three deep pools in August before spawning season (mid-September to December). The project area is the upper limit to anadromy in the lower American River, and there are salmonids of various life stages here throughout the year. The area provides a thermal refuge and preferred rearing area for juvenile steelhead in the summer and fall, due to lower water temperatures compared to other areas of the river. Adult steelhead initially arrive in mid- to late-December and spawn until March or April. The steelhead trout sport fishery in the project area is a low-retention fishery, meaning that anglers catch and release most fish, and hooking mortality (fish that die after being caught and released) is high. There are no other anadromous waters that allow fishing directly downstream of a major dam in California.

Existing Fishing Closures

Nimbus Hatchery Fish Passage Project

Figure 2-4

Invasive NZMS were found in an area upstream of the USGS gaging station cable crossing in 2008 (CDFG 2008a). It is possible for anglers walking or fishing in this area to spread the NZMS to other locations, notably to Lake Natoma, which would contaminate a portion of the water supply.

Although the American River Trout Hatchery employs strict biosecurity measures, infestation is a possibility. Contamination of the American River Trout Hatchery is a serious concern. Rainbow trout from this hatchery are used to stock many lakes and reservoirs in and around Sacramento. Because the trout are introduced to lakes and reservoirs upstream of anadromous waters, where CDFG surveys have not detected the presence of the NZMS, if the hatchery were to become infested, the CDFG would not be able to stock trout until it found a way to completely disinfect the hatchery or moved it to a new location. Infestation of the Nimbus Hatchery is a lesser concern because fish entering and exiting the Nimbus Hatchery are returning to anadromous waters in areas where evidence of NZMS has already been found.

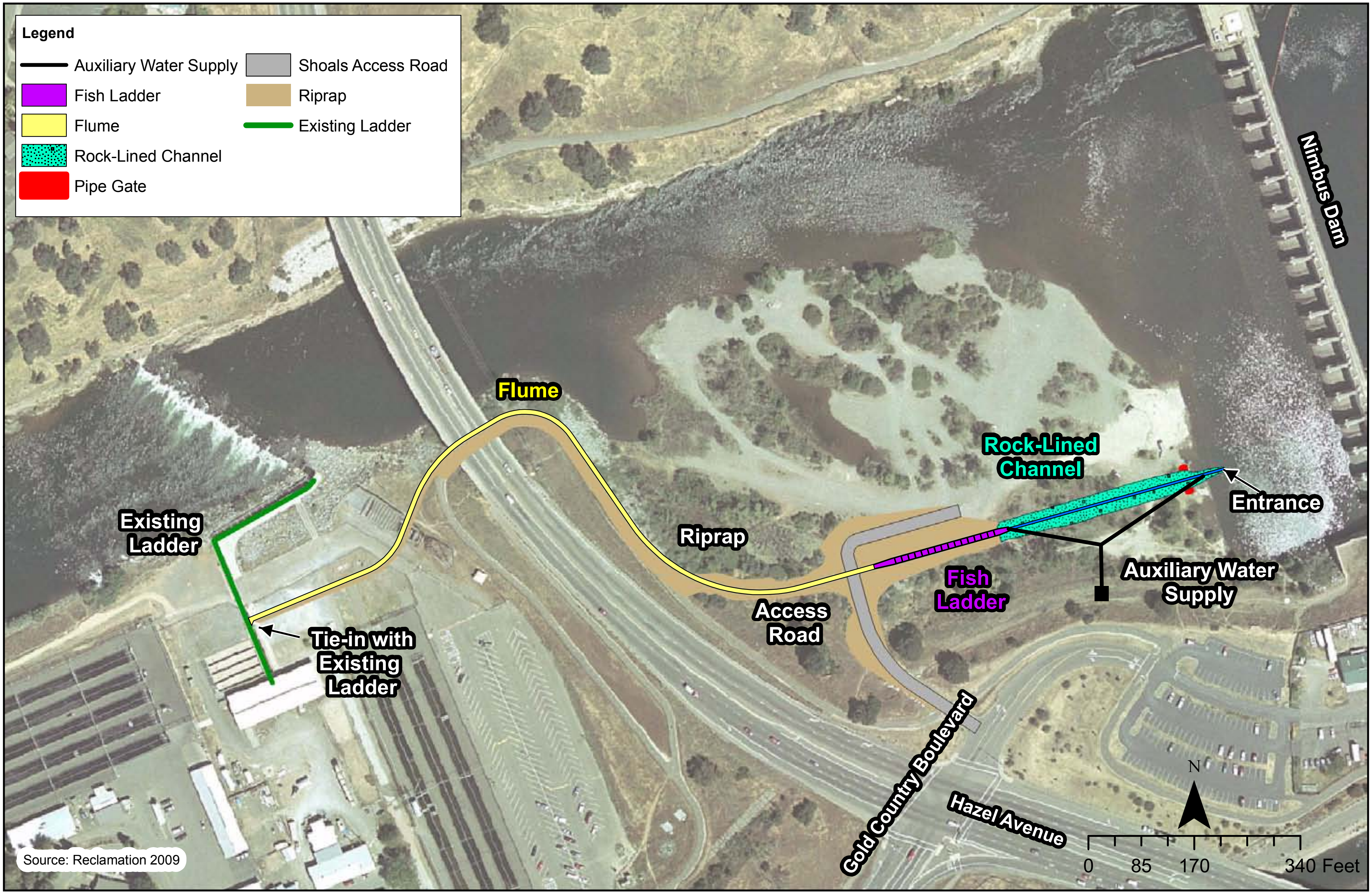
2.3 Alternative 1

Under Alternative 1, a new fish passageway would be constructed. The entrance to the fish passageway would be in the Nimbus Dam stilling basin. The new fish passageway would tie in to the existing fishway at the top of the fish ladder section near the Hatchery. The diversion weir would be removed, and Nimbus Dam would serve as the upstream barrier to fish migration. Reclamation has identified Alternative 1 as the preferred alternative.

Two options for fishing closures are being considered as Alternatives 1A and 1C. Under Alternative 1A, fishing would be closed all year within 250 feet of the new fish passageway entrance and existing outfall in accordance with current code and regulations. Under Alternative 1C, fishing would be closed all year between Nimbus Dam and the USGS gaging station cable crossing.

2.3.1 Fish Passageway

The new fish passageway would consist of a concrete flume, a pool and weir fish ladder, and a rock-lined channel (Figure 2-5). The upper portion of the fish passageway would consist of a low gradient concrete flume fishway that would begin at the top of the existing fish ladder and would extend along the south bank of the American River beneath the Hazel Avenue Bridge, to a point just downstream from the existing access road to Nimbus Shoals. A pool and weir fish ladder section would extend from the end of the flume section to a point along the edge of Nimbus Shoals. This would be followed by a rock-lined trapezoidal channel that would extend from the bottom of the ladder section to the edge of the Nimbus Dam stilling basin. Visitors would have access to areas next to the fishway but would be prevented from entering the concrete portions by fencing and guardrails.



Alternative 1: Modified Fish Passageway

Nimbus Hatchery Fish Passage Project

Figure 2-5

The fish passageway would require flows sufficient for fish attraction and adequate depth for operation. Design flow for the flume and fish ladder sections are 25 cfs. Flows up to 25 cfs would allow normal operation of the fish passageway. Supplemental water supplies up to an additional 40 cfs would be provided to attract fish to the passageway entrance. Supplemental flows would be supplied at two locations: at the bottom end of the fish ladder and at the passageway entrance. The supplemental flows would help improve attraction to the passageway and maintain an adequate depth of flow in the rock channel section. An unused 42-inch pipeline from Lake Natoma to the Hatchery would provide up to 40 cfs for fish attraction flows. A new buried 30-inch pipeline from the existing 42-inch pipeline to the lower portion of the fish ladder would be constructed to provide supplemental flows in this area.

The fish passageway would be opened when it is likely that water temperatures in the Hatchery could be maintained at approximately 60° F or lower, which usually occurs in the first two weeks of November. The fish passageway would be closed in April.

Flume and Ladder Sections

The flume section would extend for approximately 700 feet at a gradient of 0.028 percent and at a width of six feet. The gradient would be increased to 0.5 percent in the remaining 606 feet of the flume. The flume section would have slots to install stoplogs (beams or boards that assist with hydraulic adjustments) every 100 feet and would have the capability to add additional supports and weirs if needed. The velocity through the flume is expected to be one foot per second. The flume section would have fencing over the top to prevent public and predator access. The invert elevation (the floor or bottom of the internal cross section of a conduit) would be 98.0 feet at its upstream end, where the flume section connects to the existing fish ladder, and 95.45 feet at the bottom end where it would transition into the fish ladder section. The ladder section would have an invert elevation of 80 feet at the downstream end and would be positioned to start near the access road into the shoal area. The gradient within the ladder section would be 8.3 percent. The top of the concrete ladder walls at the downstream end of the ladder would be at an elevation of 88.6 feet. The ladder section would also be covered with fencing to prevent unauthorized access. A bridge to maintain access to Nimbus Shoals would be constructed over the top of the fishway, at the transition between the flume and ladder sections.

The ladder would begin submerging once the flow depth over the Nimbus Shoals exceeds an elevation of 88.6 feet msl. Based on the flow versus elevation relationship for the power plant tailrace (downstream outfall), an elevation of 88.6 feet would occur at a discharge of approximately 15,000 cfs.

Transition from the Rock Channel to the Ladder

The major portion of auxiliary flow would be input at the transition between the ladder and the rock channel, through a diffuser with a target velocity of one foot per second or less through concrete walls. Keeping the velocity at or below one foot per second would prevent false attraction that could delay fishes’ upstream migration. False attraction is a term for flows that cause fish to move toward an area that does not allow their passage. Inputting through the wall instead of the channel floor would minimize concerns with sediment plugging the diffusers, which could cause points of false attraction. A pipe gate similar to the one on the existing facility would be placed at the end of the ladder to control the number of fish entering the facility.

Rock Channel

The rock channel would be a trapezoid, with a bottom width of four feet and two-to-one side slopes. The rock channel would have a fairly mild slope of about 1.3 percent over about 400 feet. The drop would be about four feet from an elevation of 80 feet msl at the entrance to the ladder, down to an elevation of 76 feet msl where it would enter the stilling basin at the toe of Nimbus Dam. The velocities in the channel would range between one and two feet per second. The water level in the channel would be controlled by a series of six chevron-shaped gradient control structures made of rocks or cylinders that would be imbedded in the channel to form small drops and pools.

The depth in the rock channel would range between two and three feet but would be maximized as much as possible given the flow and geometry constraints. The rock channel would not be covered, nor would foot traffic be restricted. Large rock bollards would be placed around the channel to prevent vehicle access to the channel, but no fencing is planned to otherwise restrict access.

A pipe gate similar to the one proposed for the downstream end of the ladder was considered in the design for the entrance to the rock channel to prevent too many fish from entering the rock channel. However, a control gate at the river interface would be a hazard if fish or people were in the rock channel because the gate could hinder their return. In addition, during very low release periods it might be necessary to have removable stoplogs at the entrance to maintain adequate depth, and the entrance structure would require annual installation and removal during high water flow. Given these complications, a foundation capable of supporting an entrance gate would be installed during construction, and evaluations during the performance monitoring period would determine if the control structure and gate are necessary.

Initial results of numerical modeling of the shoal area under high flows indicated to the design team that the rock could be placed without grout. The members of the Interagency Fish Passage Team, who reviewed initial design alternatives, concurred that an ungrouted channel would be more fish friendly.

Flow simulations have been performed on the river between Nimbus Dam and the Nimbus Shoals area, with the new fish passageway design included (Reclamation 2010). An area of high contours approximately 500 feet downstream of the dam would control the upstream water surface elevations and produce a riffle at low flows. Most of the rock channel would be at or below the elevation of the river and surrounding topography; therefore, water would be in the rock channel most of the year, even when the fish ladder is not operational. The lowest river flow assumed in the design of the rock channel entrance invert was 250 cfs, based on current operational requirements. The invert of the rock channel entrance was designed to provide a minimum of three to four feet of depth at the entrance to the fishway when the river is at its lowest flow rate. The rock channel invert would be set at an elevation of 76 feet msl. The rock channel and shoals would submerge at random, and the submergence would be controlled by the topography.

Auxiliary Flow

The auxiliary flow system would introduce water at both the bottom of the ladder section and at the entrance to the fishway. Most of the available auxiliary water would be introduced at the top of the rock channel to produce adequate flow velocity and depth through the rock channel. The remainder of the auxiliary flow would be added to the Nimbus tailrace at the fishway entrance, providing a small amount of flow to assist with attraction.

Viewing Plaza

A viewing plaza would be constructed on the north side of the fish passageway near the top of the flume section, where fish enter the Hatchery. The viewing plaza would be approximately 100 feet long by 30 feet wide and would provide a convenient location for the public to view fish in the passageway at the Hatchery. The viewing plaza would conform to the Americans with Disabilities Act (ADA; Title III Regulations, 28 CFR, Part 36). The viewing plaza would be connected to an existing walkway that would be modified to conform to the ADA. The walkway leads from the parking lot three-quarters of the way to the lower American River in the vicinity of the existing weir. Construction of the viewing plaza and modification of the walkway would be contingent on the availability of funds.

2.3.2 Existing Weir Removal

The existing weir would be removed to a fixed elevation, but not until the new fish passageway is used successfully for one or two seasons. A design and conceptual process for removing the weir includes cutting off and off-site disposal of the piers, removing all the sheet pile, wire, and rebar in the foundation and surrounding river bottom, and removing and redistributing the large angular rock and cobble in the foundation to the finished grade of the river. Initial numerical modeling has shown that the riffle immediately downstream of Nimbus Dam would be further exposed in the river under low flows; no riffle is anticipated in the vicinity of the weir after the weir is removed.

2.3.3 Construction Activities

A total of eight acres would be temporarily affected by construction of the fish passageway and removal of the existing weir. The area permanently affected would be 1.6 acres.

Implementation would take place in three phases. First, during year one, the new fish passageway would be constructed.

Next, the new fish passageway would be operated and evaluated to support the operational integration of the new fishway before decommissioning the facilities. The objectives of the evaluation would be to ensure that the new fishway meets the fish passage hydraulic design criteria; that chinook salmon can effectively find, enter, and move through the new facility without blockage or undue delay, and that overall performance is sufficient to allow the collection of the fish necessary to meet Hatchery mitigation goals. Studies would be designed to evaluate the operational flexibilities of the fishway flow distribution and volume to maximize fish attraction and passage under various hydrologic conditions. Two years of evaluation of fishway hydraulics and fish movements would be needed to capture a range of different hydrologic conditions. The existing fish ladder and weir would remain in place until the new fish passageway is demonstrated to function properly. The existing fish ladder would not be open to fish passage, and the existing weir superstructure would not be in place during this time.

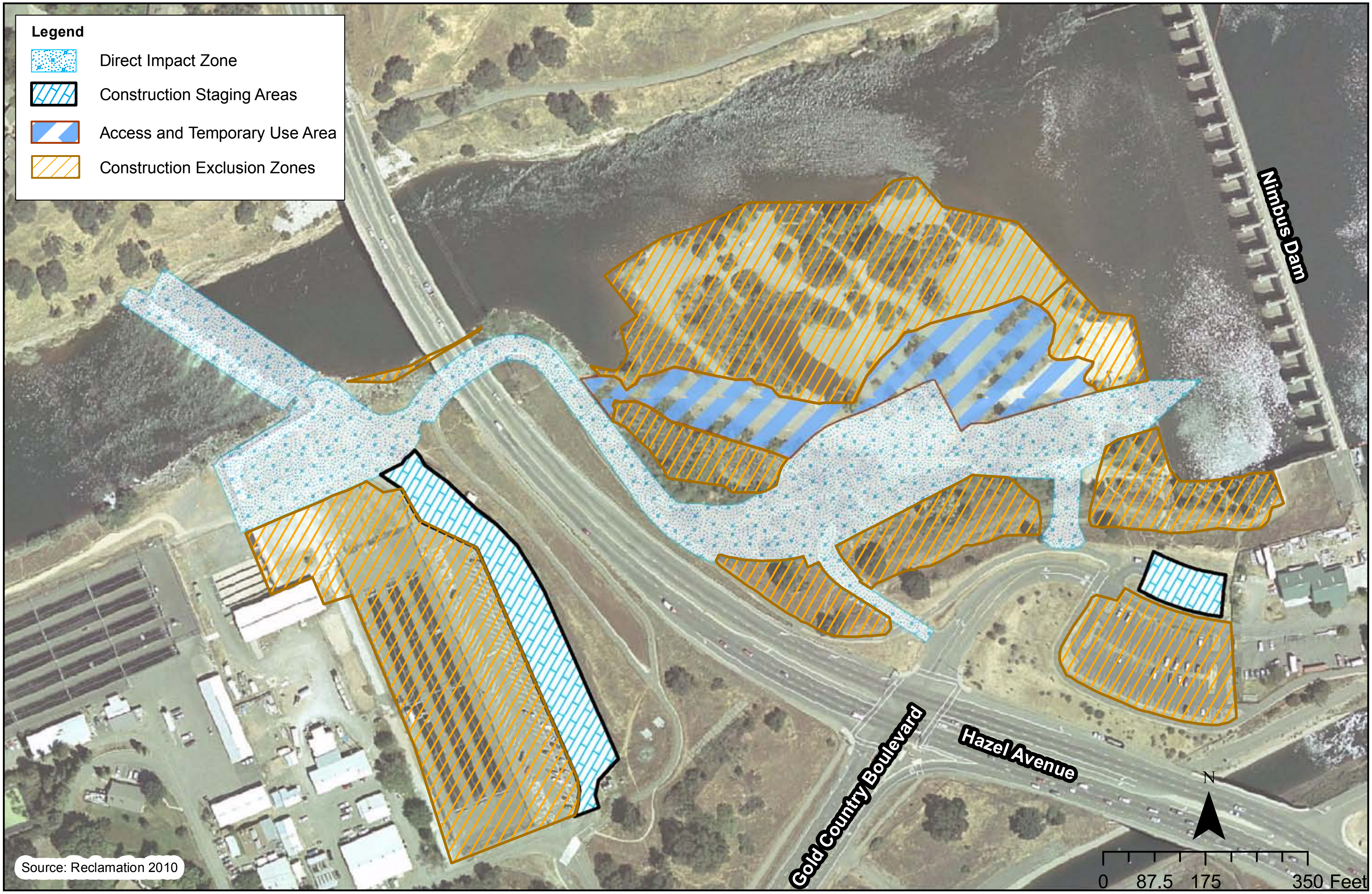
Finally, after satisfactory performance of the new fish passageway is demonstrated, the weir would be removed and any modifications to the new fish passageway would be made. All in-river construction would be limited to June through September. The anticipated construction staging areas, access pathways, and direct impact zones are shown in Figure 2-6.

The abandoned portion of the existing fish ladder would likely be left in place after the project is complete and either covered over or filled with clean fill.

Construction equipment would be staged in two areas, as shown in Figure 2-6. The main staging area would occupy approximately 1.1 acres of the Hatchery parking lot. This would require closing about 65 parking spaces for eight months during the first year for construction of the fish passageway. Two to three years later, this area would be closed from May through September to remove the weir. Removing the diversion weir would be from June through September to protect adult salmon and steelhead and to avoid high flood releases. An additional 0.2-acre staging area in the CSUS Aquatic Center parking lot would require temporarily closing approximately 30 parking spaces, including two parking spaces for the disabled.

During the project planning and design, Reclamation has made a number of environmental commitments to reduce the environmental impacts from the proposed project (Appendix C). These measures are incorporated into the project description and include best management practices (BMPs) that would be used to reduce potential impacts during construction and demolition. Construction equipment, including haul trucks, would cross the bike trail at the entrance to the Hatchery and the entrance to Nimbus Shoals. Access to the Nimbus Shoals area by vehicle and foot traffic would be controlled or restricted as needed to ensure public safety during construction of the fish passageway upstream of the Hazel Avenue Bridge. Parking on Nimbus Shoals is uncontrolled and would be affected during fish passageway construction.

The portion of the American River bike trail immediately beneath Hazel Avenue is within the area that would be occupied by the flume section of the fish passageway. Up to 1,100 feet of the bike trail that is parallel to and beneath Hazel Avenue would need to be moved up the roadway embankment to make room for the fish passageway. The County of Sacramento would be responsible for the design and reconstruction of the new trail, consistent with its roadway corridor lease agreement with Reclamation. Reclamation and



Alternative 1: Construction Staging and Impact Zones

Nimbus Hatchery Fish Passage Project

Figure 2-6

the County would continue to integrate the work into the sequence of construction activities in a way that maintains public safety and complies with all permit conditions. Efforts would be made to minimize the impacts on bike trail use, but the trail would need to be closed temporarily during construction of the flume section of the fish passageway, requiring bicyclists to use the crosswalk at the intersection of Hazel Avenue and Gold Country Boulevard (Robinson 2010).

Construction for the concrete flume fishway would take place in a 65-foot corridor, except under the Hazel Avenue Bridge, where it would be more restricted.

Heavy equipment, including track loaders, bulldozers, and excavators, would be used to remove or redistribute rock and cobble foundation of the diversion weir. A temporary construction road would provide access from the staging area to the foundation of the weir. Heavy equipment would be driven along the access road and foundation within the river to access the northwest side of the river, where a notch in the foundation between the right abutment and next closest pier would be excavated. The notch would reduce the volume of water flowing over the weir to help access the structure and to control sediment during excavation. After the diversion weir is removed, the access road would be removed, riprap would be replaced along the bank, and the disturbed area landward of the riprap would be restored. Concrete and steel remnants of the diversion weir would be disposed of off-site. The large riprap in the foundation would be removed and stockpiled for future use, or it would be redistributed within the deeper areas next to the existing foundation. The area affected by removal of the diversion weir would extend about 35 feet upstream and downstream of the diversion weir and total approximately half an acre.

A cofferdam or temporary watertight structure built with large sand-filled bags would be used to dewater the site for constructing the entrance to the fish channel. The berm, or sheet pile, would be removed to an off-site storage or disposal area after construction.

The construction cost for Alternative 1 is estimated at $6.5 million.

2.3.4 Operations and Maintenance

The current ladder is cleaned, inspected, and repaired, as needed, annually, but the new ladder would require additional time to clean because it would be much longer. Water for the upper portion of the ladder would come from the main supply line at the Hatchery at a rate of about 25 cfs. Augmentation flows would come from the 42-inch pipeline, at a point between Nimbus Dam and Hazel Avenue and at a rate of up to 40 cfs.

2.3.5 Fishing Regulations

The lower American River is open to fishing year-round from Nimbus Dam to the Hazel Avenue Bridge, in accordance with Title 14 CCR, Section 7.50(b)(5)(A). The river is open to fishing from January 1 to September 14 from the Hazel Avenue Bridge to the USGS gaging station cable crossing and closed during spawning season (September 15 to December 31), in accordance with Title 14 CCR, 7.50(b)(5)(B). The USGS gaging station cable crosses the river approximately 900 feet downstream of the diversion weir.

Downstream of the project area, the river is open to fishing from January 1 to October 31, from the USGS gaging station cable to the SMUD power line crossing at the southwest boundary of Ancil Hoffman Park (CDFG 2008c).

Two implementation options for Alternative 1—Alternative 1A and Alternative 1C—are being evaluated because the CDFG is considering modifying fishing closure regulations in the project area.

Alternative 1A

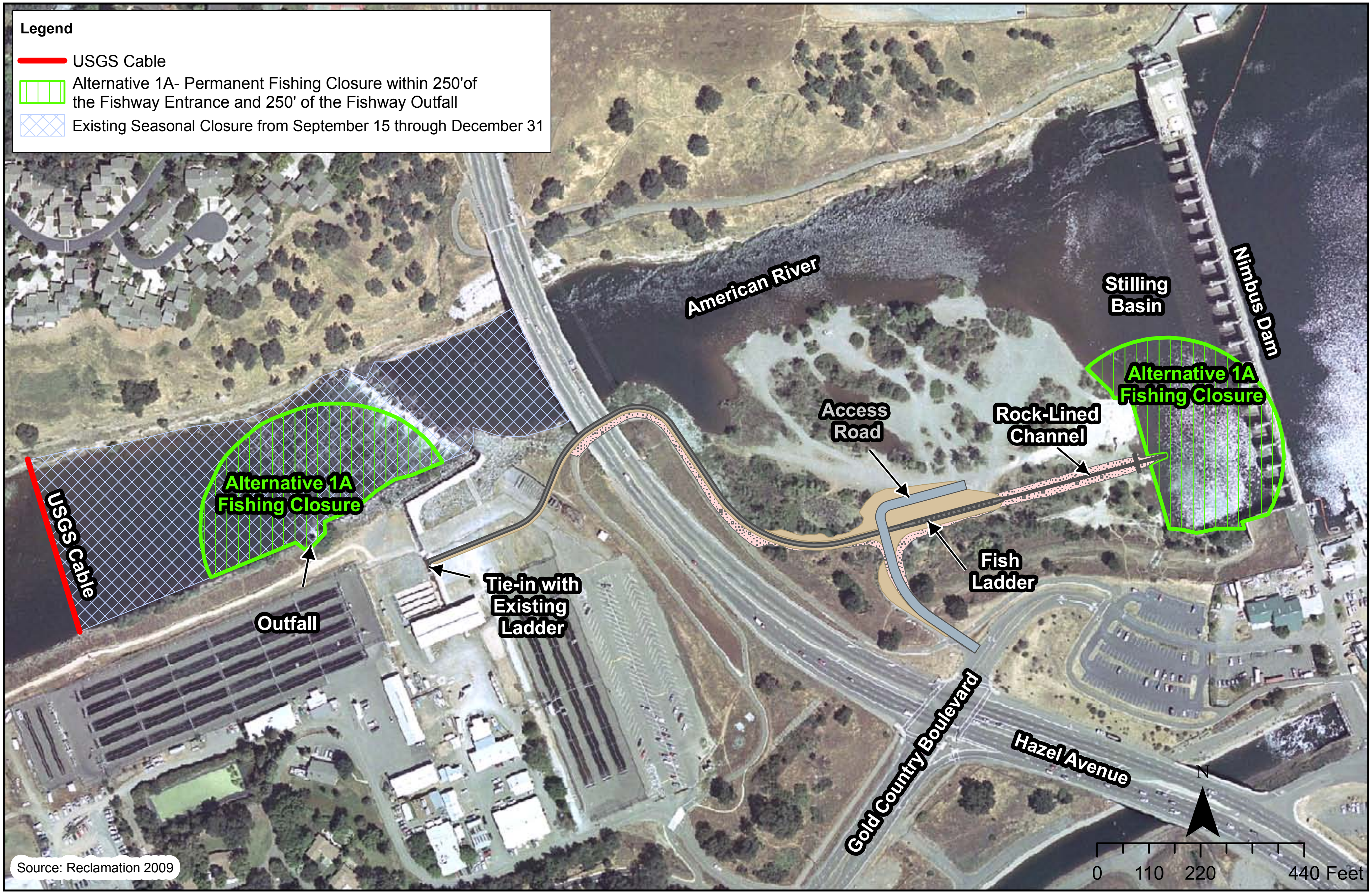
Under Alternative 1A, fishing closures would apply all year within a radius of 250 feet of the modified fish passageway entrance and the Hatchery fishway outfall (Figure 2-7). These fishing closures are based on fishing regulation Title 14 CCR, 2.35, which states that no fish may be taken within 250 feet of a fishway, egg-taking station, dam, or weir or of any rack that has a fishway or egg-taking station. This closure would be in addition to the existing seasonal closure from the Hazel Avenue Bridge to the USGS gaging station cable crossing, in accordance with Title 14 CCR, 7.50(b)(5)(B).

Alternative 1C

Under Alternative 1C, new fishing regulations would be implemented and fishing would be closed year-round between Nimbus Dam and the USGS gaging station cable crossing (Figure 2-8). These regulations are needed in part because salmon and steelhead would be more vulnerable to harvest by sport anglers with the removal of the weir. In addition, CDFG has the authority to protect designated spawning areas to the extent necessary to protect fishlife in these areas per Fish and Game Code 1505. Presently the weir blocks passage of most fall-run chinook salmon into Nimbus Shoals during the spawning season. With the construction of an extended fish ladder and the removal of the weir, fish would primarily congregate in the Nimbus stilling basin, which has unrestricted public access. In addition, the Nimbus stilling basin provides optimal rearing habitat for juvenile steelhead because of the colder water temperature and the presence of two deep pools. Alternative 1C is being evaluated because it would provide additional protection of salmon and steelhead that would congregate in the Nimbus stilling basin and are highly susceptible to sport fishing. This closure would also minimize the potential for the spread of NZMS by limiting the exposure caused by transport on fishing gear and boots from infested areas near the American River Trout Hatchery.

2.3.6 Public Access and Features

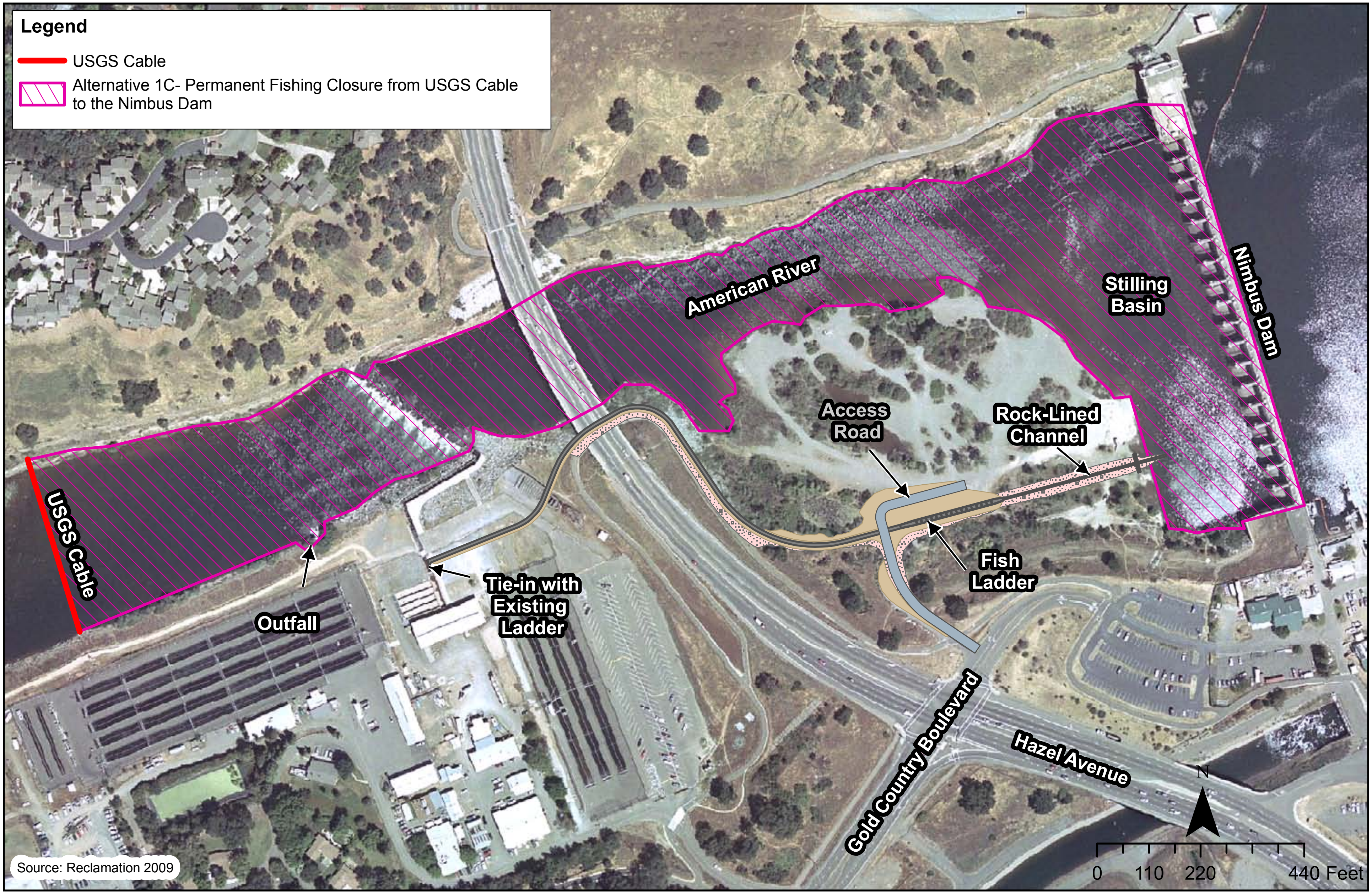
Under both Alternatives 1A and 1C, Nimbus Shoals would remain open to the public from 6:00 AM to 9:00 PM during the summer and from 7:00 AM to 7:00 PM during the winter. A bridge and roadway across the upper portion of the fish ladder section would be provided to allow public access to the Nimbus Shoals area. A second bridge would span the flume section between the Hatchery and Hazel Avenue Bridge to provide access and egress to the lower portions of the fish ladder and the American River. All facilities constructed would conform to the Americans with Disabilities Act (Title III Regulations, 28 CFR, Part 36). The Nimbus Hatchery would also remain open to the public. The Hatchery Visitor Center is currently open daily from 10:00 AM to 3:00 PM. Temporary access restrictions would result from construction, as described in Section 2.2.



Alternative 1A: Modified Fish Passageway and Fishing Closures

Nimbus Hatchery Fish Passage Project

Figure 2-7



Alternative 1C: Modified Fish Passageway and Fishing Closures

Nimbus Hatchery Fish Passage Project

Figure 2-8

2.4 Alternative 2

Alternative 2 would construct a new fish weir and would continue to use most of the existing fish ladder. Additional entrances would be added to the existing fish ladder, and the existing weir would be replaced immediately upstream (Figure 2-9).

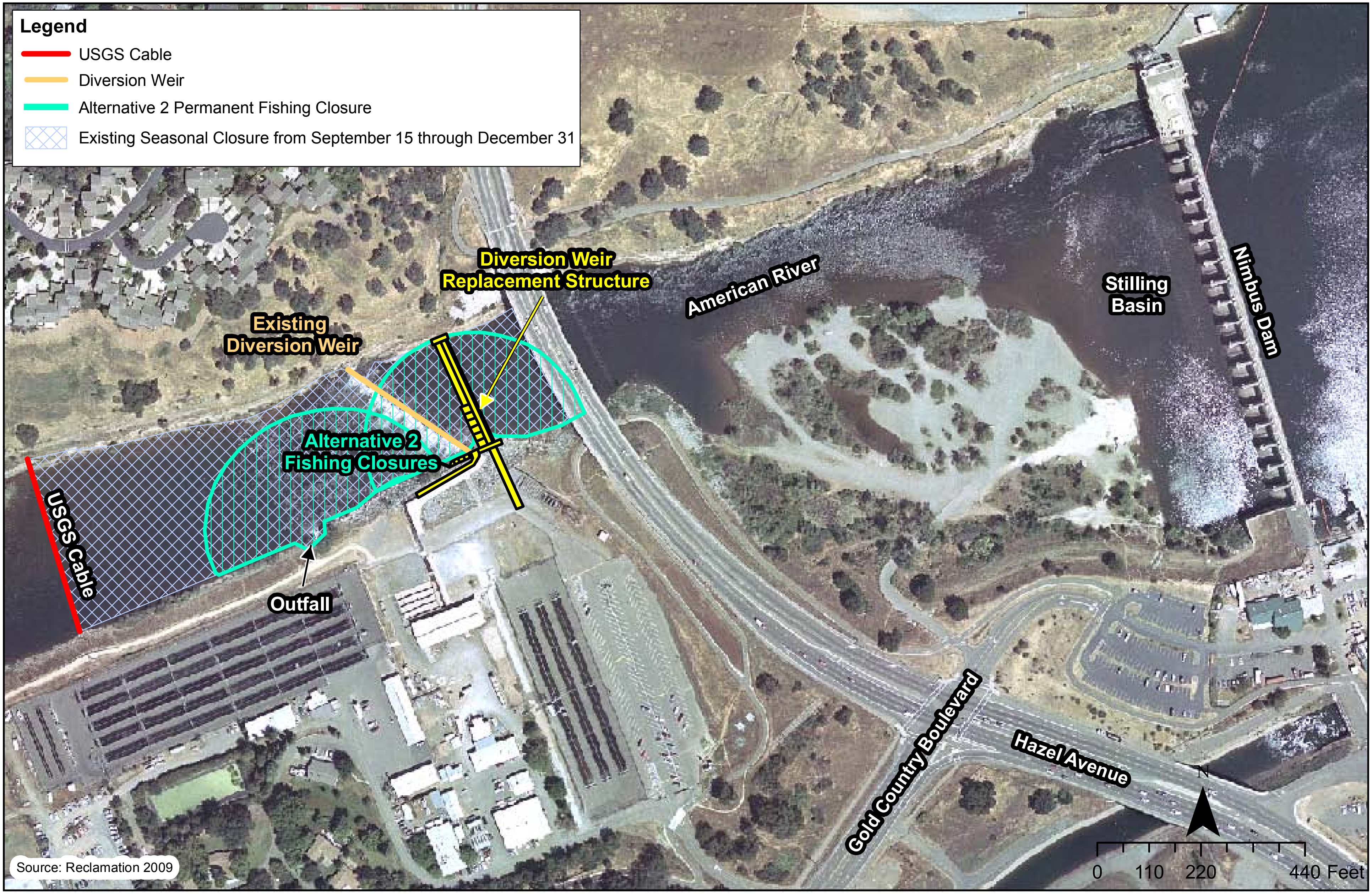
2.4.1 Replacement Weir

This alternative consists of a 750-foot-long, 52-foot-wide concrete weir that would span the width of the river just upstream of the existing ladder entrance. The crest of the diversion weir would be at an elevation of 79.5 feet msl. Six 15-foot-wide bypass bays on the south (Hatchery) side of the river would allow access to maintain the structure at flows less than 2,500 cfs. A deck at elevation 81 feet msl would be built over the bays to allow access to the remainder of the structure for maintenance. The structure would be designed to withstand flood flows of 160,000 cfs with minimal damage. The base of the ladder would be modified to add entrances; most of the ladder would still be used as is. The modified ladder would have four separate entrances, at different elevations, that would be used in combination or alone to maximize fish entry into the ladder over a range of river elevations and flow rates. The new entrances would be positioned so as to operate optimally in flows up to 7,000 cfs. Performance would be expected to decline at flows exceeding 7,000 cfs; however, fish could still enter the ladder at higher flows up to approximately 25,000 cfs.

Each bypass bay would have an air-bladder-operated gate to control the flow through the bays. The gates would be lowered when the ladder is not in use and would be raised to block fish when needed for hatchery operations. Pickets would extend from the top of the gates to prevent salmon from swimming upstream when the gates are raised.

A new entrance to the existing fish ladder would function for river flows up to 7,000 cfs. Four entrance gates would provide the ability to change the entrance position based on velocity in and immediately downstream of the bypass portion of the diversion weir. The structure would be fish tight and would not allow adult fish to continue upstream. A denil fish ladder would be included to allow for the passage of juvenile salmonids upstream of the diversion weir. The entrance into the denil ladder would be within the first bay of the ladder and would have a downstream invert of 74 feet msl, an upstream invert of 78.8 feet msl, and an overall slope of five percent. It would provide for passage of juvenile salmonids when river flows are in the range of 1,000 to 2,500 cfs, when the bypass is closed; the denil fish ladder would be inoperable when the bypass is open. Water velocities in the V-section of the denil ladder would be in the range of one to two cfs.

The riprap on the south bank of the river would be returned to the existing condition (armored with riprap). The rock would come from the existing bank material, the existing diversion weir foundation, and if necessary, from off-site sources.



Alternative 2: Replacement of Existing Weir and Fishing Closures

Nimbus Hatchery Fish Passage Project

Figure 2-9

2.4.2 Construction Activities

Construction would take two years. All in-river construction would be limited to June through September. During the first year, a coffer dam would be constructed in the south half of the river to allow construction of the bypass bays, fish ladder entrance, and a portion of the diversion weir. A portion of the existing diversion weir would need to be removed before constructing the entrance to the Hatchery and fish passage ladders. During the second year, a coffer dam would be constructed on the north side of the river, and that portion of the diversion weir would be completed. The anticipated construction staging areas, direct impact zones, and exclusion areas are shown in Figure 2-10.

During the project planning and design, Reclamation has made a number of environmental commitments to reduce the environmental impacts from the proposed project (Appendix C). These measures are incorporated into the project description and include BMPs that would be used to reduce potential impacts during construction and demolition. Access to the construction site would be across the newly constructed portion of the replacement weir. River flows would be directed through the bypass bays as the north portion of the weir and the modified fish ladder entrance are constructed. The remaining portions of the existing weir would be removed, as discussed under Alternative 1A, except that the bypass gates would be closed to allow equipment to reach the existing weir. This may require the temporary placement of rock downstream of the bypass; thus, the water would be shallow enough for the equipment to pass. With the bypass closed, the river would flow over the crest of the weir.

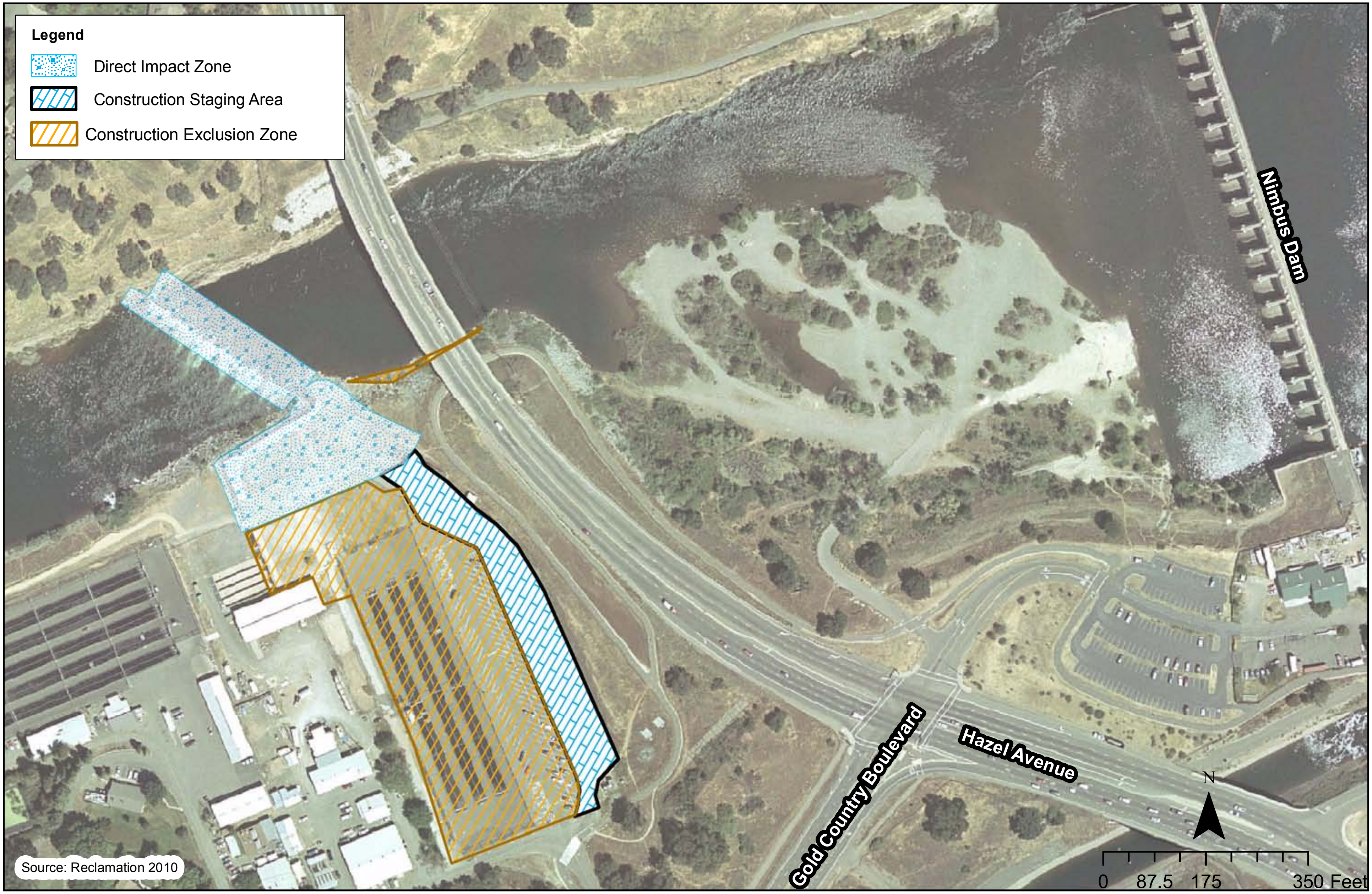
The construction cost for Alternative 2 is estimated at $12 million.

2.4.3 Operations and Maintenance

The gates and pickets in the bypass bays and the pickets over the entire structure would be raised to 79.5 feet msl in early September of each year. They would be lowered in late December after the hatchery stops taking salmon. This would result in water flowing over the entire crest of the diversion weir during this time. At flows exceeding 7,000 cfs, the gates would be lowered. The denil fish ladder would be open from early September until late December while the bypass is closed. It would be closed the rest of the year, requiring fish to pass upstream through the bypass section. Operations and maintenance of the ladder portion of the structure would be similar to that conducted for the No Action Alternative. Annual installation of the weir would no longer occur, but maintenance of the new weir is expected to be extensive, given the movable parts associated with the bypass gates and pickets, hydraulic systems, and multiple ladder entrances.

2.4.4 Fishing Regulations

Fishing regulations and closures would not be changed under Alternative 2. See Section 2.2 for information about existing fishing closures.



Alternative 2: Construction Staging and Impact Zones

Nimbus Hatchery Fish Passage Project

Figure 2-10

2.4.5 Public Access and Features

Public access to the area would not be changed under Alternative 2. No additional features related to public use of the area would be considered or constructed.

2.5 Visitor Management Options for Nimbus Shoals

Currently, the public has full access to Nimbus Shoals from 6:00 AM to 9:00 PM during the summer and from 7:00 AM to 7:00 PM during the winter. Three alternatives to current public access are being considered at the programmatic level: public vehicle access with a defined parking area, walk-in only access (no public vehicle access), and no public access. At this time, Reclamation has not identified a preferred public access scenario.

Public Vehicle Access with Defined Parking

Under this option, the public would be able to access Nimbus Shoals during established hours by vehicle or by nonmotorized means, such as on foot or bicycle; however, motorists would have to leave their vehicles in a defined parking area and would not be able to drive to the water's edge. Driving off the main parking area would be prevented by barriers, such as bollards or large rocks, and would be a citable offense. The parking area would be unpaved. Other visitor amenities that Reclamation may provide include picnic tables, sanitation facilities (portable toilets, hand wash stations), trash cans, and interpretive/educational signs. All facilities provided would be ADA compliant. Reclamation maintains the right to charge fees associated with use; however, at this time no use fees are anticipated.

Reclamation has the authority to collect fees through legislated authority or by entering into a management agreement with another agency (Reclamation 1999b).

Walk-in Only (No Public Vehicle) Access

Under this option, the public would have access to Nimbus Shoals during established hours by nonmotorized means, such as on foot or on bicycle. The public could park without charge at the Hatchery to access Nimbus Shoals. Walk-in access would be provided via a foot gate. Other visitor amenities that Reclamation may provide include picnic tables, sanitation facilities (portable toilets, hand wash stations), trash cans, and interpretive/educational signs. All facilities provided would be ADA compliant. Reclamation maintains the right to charge fees associated with use; however, at this time, no use fees are anticipated.

No Public Access

All public access to Nimbus Shoals would be prohibited, and the area would be secured with fencing. Trespassing would be a citable offense. Administrative access for purposes such as operations and maintenance and patrolling and law enforcement would continue regardless of the option chosen. Public access to the north bank of the lower American River would not be affected, but the north bank is currently fenced because it is very steep, and access is not sanctioned.

Under any of the above options, a Visitor Use Management Team would be designated to coordinate on implementing the selected option and long-term management of visitors at Nimbus Shoals. The management team may include DFG, CDPR, Reclamation, and other agencies or entities not specifically mentioned here.

In Chapter 4, the impacts of the three visitor management alternatives for Nimbus Shoals are discussed under Alternatives 1A and 2. The impacts of the visitor management options are not specifically discussed under Alternative 1C because they would be similar or slightly reduced compared to Alternative 1A. This is because the Shoals would likely receive fewer visitors due to the fishing closure. The maximum effects of implementing the different visitor management alternatives are presented under Alternative 1A; however, Reclamation could implement any of the three visitor management options under Alternative 1C.

2.6 No Action Alternative

Under this alternative, the existing weir would not be replaced nor would a modified fish passageway be constructed. No new major construction would take place. Regular and extraordinary repairs to the existing weir foundation and piers, requiring construction and in-river work, are expected in years following significant floods, approximately once every 10 years. The existing weir would continue to degrade, and reduced flows would be required annually to install and remove the weir (as described in Section 2.2). Fishing regulations and closures would not change.

2.7 Alternatives Considered but Eliminated from Detailed Evaluation

To be considered for evaluation, an alternative to the proposed action had to meet the purpose and need for the proposed action (as described in Section 1.2). It also had to satisfy functional requirements, which were defined in the PASS and the Project Requirements Document (Reclamation 2006a, 2006c). The overarching project functional requirements are as follows:

- Maintain functionality and continuity of hatchery operations;
- Minimize operation and maintenance costs;
- Eliminate hazards and improve worker and public safety; and
- Minimize effects on biological and human environments (Reclamation 2006a).

In addition, the following functional requirements were developed:

- Provide the conditions necessary to attract fish into the entrance of the fish ladder (adult chinook salmon from mid-September through the end of December and steelhead from January through April);
- Provide the conditions necessary to attract fish into the entrance of the ladder over a range of flow conditions up to 5,000 cfs;
- Avoid major changes to hatchery processes or infrastructure;
- Provide for normal operation and maintenance of any in-river structure without reducing flows;
- Design the fish passageway and weir to withstand flood releases of up to 160,000 cfs without significant damage;
- Design the fish passageway and weir to be safe from vandalism;
- Minimize the cost and difficulty of operation and maintenance;
- Minimize to the extent possible routine operations and maintenance that place personnel at a higher risk to injury or life-threatening situations;
- Minimize physical facilities or site conditions that place staff, law enforcement officials, and the public at a higher risk to injury or life-threatening situations;
- Avoid changes to local river hydraulics;
- Minimize adverse impact on hydropower production at Nimbus Dam;
- Minimize the length of time for fish to enter and pass through the fish passageway;
- Enhance the ability to deter illegal activity (such as vandalism and illegal fishing) or to enforce current regulations;
- Provide reliability and durability under normal flow conditions;
- Ensure a net positive benefit to the fall run chinook and steelhead; and
- Provide juvenile steelhead year-round passage to the section of river between the existing weir and Nimbus Dam.

Numerous alternatives were evaluated for Reclamation to develop options that meet the project's purpose and need and the functional requirements above. The following is a summary of alternatives considered and why they were eliminated from detailed analysis.

Tunnel Fish Ladder Under Hazel Avenue. Tunneling the fish ladder under Hazel Avenue was proposed as the shortest distance between the Hatchery and the ladder entrance in the Nimbus stilling basin. This proposal was rejected because of the cost of engineering a tunnel under a roadway to accommodate traffic safety and seismicity concerns. An additional concern, which would require additional cost, was that fish would be reluctant to enter or leave an unlighted tunnel.

Fish Ladder Alignment to Accommodate Kayak Course. Kayakers asked that alternatives be considered that would allow for the construction of a kayak course in the future. This accommodation would require the fish ladder be built close to the river along Nimbus Shoals. This alternative was rejected because of the cost of fill to bring the ladder up to a functional elevation and the increased risk to the fish ladder and downstream structures created by placing the ladder farther into the floodplain, where it would be a hydraulic impediment during flood flows.

Fish Passage Around Nimbus Dam. The NMFS suggested that fish passage around Nimbus Dam would create more usable habitat for anadromous fish. This alternative was eliminated because it did not meet the purpose and need of the project. Additional concerns included the cost and absence of quality habitat between Nimbus Reservoir and the Folsom stilling basin.

Fish Passage with Rectangular Concrete Flume. A 1,522-foot-long, rectangular, concrete flume fish passageway was considered. Engineering design revealed that, in order to achieve the required gradients, a 20-foot-high concrete wall would need to be constructed in the Nimbus Shoals area. This alternative was eliminated because the concrete wall would have an undesirable impact on the human environment in the project area. In addition, the wall would not be secure from flooding and vandalism.

Replacement Weir with Four Bypass Bays. A replacement weir with four bypass bays was eliminated from consideration in favor of a replacement weir with six bypass bays. The six-bay alternative is included in this EIS/EIR as Alternative 2. The four-bay design is less accommodating to juvenile steelhead passage, which would result in unacceptable impacts on the biological environment in the project area, especially considering that steelhead are now a listed species.

Extended Fish Ladder with Fishing Closure from Nimbus Dam to the Hazel Avenue Bridge (Alternative 1B). Previous consideration was given to implementing Alternative 1 with a fishing closure from Nimbus Dam to the Hazel Avenue Bridge. This was presented at the public scoping meetings for this EIS/EIR as Alternative 1B. This alternative was eliminated from further analysis because of its similarity to Alternative 1C, under which permanent closures between the Nimbus Dam and USGS gaging station cable crossing are proposed. In addition, Alternative 1B would not address concerns about the spread of the NZMS from fishing upstream of the cable crossing.

3. Affected Environment

The affected environment section of this EIS/EIR was prepared in accordance with NEPA and CEQ regulations and guidelines and CEQA and the CEQA Guidelines.

This section provides an environmental baseline of each resource category and the conditions on and next to the project area at the time this document was prepared. The region of influence varies by resource and is defined, where appropriate, for each resource. The regulatory framework, or applicable laws, ordinances, regulations, and guidance pertinent to the resource category, is also presented, where appropriate. Section 1.7 provides an additional overview of legal authorities relevant to the proposed project.

The following resources could be affected by implementing Alternative 1A, Alternative 1C, Alternative 2, or the No Action Alternative. The affected environment or environmental setting for each of the resources listed is discussed in the sections that follow:

- Fisheries;
- Biological resources;
- Recreational resources;
- Cultural resources;
- Geology and soils;
- Water resources;
- Hazardous materials;
- Public health and safety;
- Infrastructure (including utilities and transportation);
- Energy;
- Air quality;
- Noise;
- Land use;
- Visual resources; and
- Socioeconomics and environmental justice.

Indian Trust Assets (ITAs) are legal interests in property held in trust by the US for federally recognized Indian tribes or individual Indians. Reclamation assesses the effect of its programs on tribal trust resources and federally recognized tribal governments. The

DOI Departmental Manual Part 512.2 ascribes the responsibility for ensuring protection of ITAs to the heads of bureaus and offices (US Department of the Interior 1995). The nearest ITA is the Auburn Rancheria, 15.8 miles north-northwest of the project. Since no ITAs are within the APE of the proposed project, they are not analyzed for this project (Rivera 2009).

3.1 Fisheries

3.1.1 General Fisheries

The lower American River is habitat for numerous fish species. Examples of anadromous game fish are striped bass (*Morone saxaatilis*), white sturgeon (*Acipenser transmontanus*), and American shad (*Alosa sapidissima*). Gamefish include the brown trout (*Salmo trutta*), largemouth bass (*Micropterus salmoides*), and bluegill (*Lepomis macrochirus*). There are also numerous nongame fish that occur in the lower American River, such as carp (*Cyprinus carpio*), goldfish (*Carassius auratus*), and tule perch (*Hysterocarpus traskii*) (Phillips 2009a).

3.1.2 General Habitat Description

The project area is within the lower American River, from the Nimbus Dam downstream to 500 feet downstream of the USGS gaging station cable. On the American River, the project area is between river miles 22 and 23. Water for the project area comes from Lake Natoma, a 525-acre afterbay for Folsom Lake. Folsom Dam impounds the south and north forks of the American River and has a drainage of approximately 1,895 square miles. The American River basin is east of the City of Sacramento in the Sierra Nevada range.

Nimbus Dam is 6.8 miles downstream of the Folsom Dam and reregulates water released from Folsom Lake. The concrete gravity Nimbus Dam is 1,093 feet long and 87 feet high and forms Lake Natoma, with a capacity of 8,760 acre-feet. Eighteen radial gates, each 40 feet by 24 feet, control the flows.

There are three large pools in the project area, between the USGS gaging cable and the Nimbus Dam. They are in the river between the weir and the cable crossing, under the Hazel Avenue Bridge, and in the stilling basin. There is a riffle between the pools under the Hazel Avenue Bridge and in the stilling basin. Some of the river bottom in this area is composed of cobbles, but most of the area is hard clay. Lack of gravel limits the effectiveness of the project area to serve as suitable spawning habitat. Adult salmonids likely use this section of the lower American River as a holding area, and probably steelhead use it as rearing habitat (Phillips 2009a).

There is little riparian vegetation that overhangs the river in the project area. Overhanging riparian vegetation is important because it provides shade and lowers the water temperature. Overhanging vegetation is limited to the south bank, north of the Hazel Avenue Bridge. The banks of the lower American River on both sides of the project area are clay, with riprap in some areas (Phillips 2009a).

The average discharge of the lower American River is 3,750 cfs but has varied from 730 to 7,900 cfs (Williams 2001). Figure 3-1 shows the American River lows and temperatures from 2001 to 2007. Flows were measured at Fair Oaks (USGS 11446500), and the temperatures were measured at Hazel Avenue in the project area (Hannon and Deason 2007).

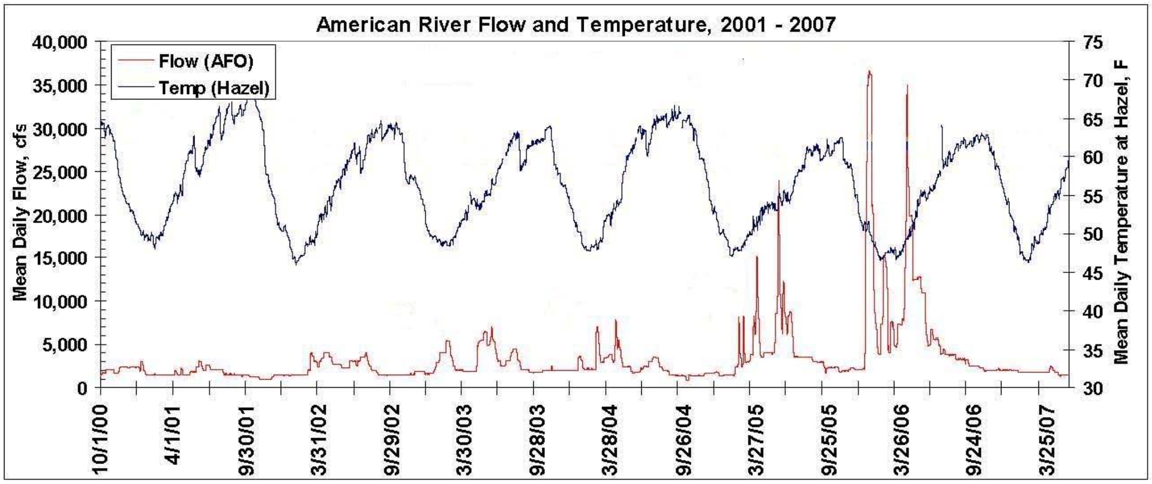


Figure 3-1: American River Flows and Temperatures

The weir used to direct fish into the Hatchery is 326 feet long and is a quarter-mile downstream of Nimbus Dam. It is at a 55-degree angle from the center line of the river. Originally erected in 1955, the weir foundation consists of eight vertical concrete piers every 30 feet and riverbank abutments. The foundation is permanent, but the superstructure is installed annually to direct fish into the fish ladder leading to the Hatchery. The superstructure consists of a support frame, pickets (vertically aligned cylindrical steel bars), and a walkway. To install the superstructure, river flows must be lowered to 1,000 to 1,500 cfs, which is undesirable because this negatively affects the availability of fish habitat in the lower American River, by reducing the amount of cover from predation and increasing fish densities in the remaining habitat, thus increasing the potential for disease to spread. Lowering flows can also degrade habitat by raising temperatures and increasing turbidity (NMFS 2009). River flows must also be lowered whenever repairs must be made to the superstructure. This lowering of river flow can last from less than one hour to up to five days. Damage to the weir can allow species to bypass the entrance to the Hatchery and to proceed up to Nimbus Dam. The weir is typically in place from mid-September through mid-December.

The operation of the weir and the Hatchery has no effect on the water upstream of the weir to Nimbus Dam, other than the backwater effect of the permanent weir foundation.

The area between Hazel Avenue and Nimbus Dam, known as Nimbus Shoals, is a popular area for anglers. They are allowed to use vehicles throughout the Nimbus Shoals, and there is a possibility for habitat degradation from oil and fuel spills and garbage. Fishing is allowed year-round in the Shoals area, which historically has one of the highest citation rates for the illegal take of salmon in northern California (Lucero 2009). Adult chinook salmon will congregate in the project area in three deep pools in August before spawning. Hooking mortality for species in the area is high. There are no other anadromous waters in California where fishing is allowed directly downstream of a major dam.

3.1.3 Sensitive Species

The project area contains habitat for sensitive fish species, shown in Table 3-1.

Table 3-1 Sensitive Fish Species Occurring in the Project Area

Common Name	Scientific Name	Preferred Habitat	Federal/State Status	Likelihood of Occurrence
River lamprey	*Lampetra ayersi*	Clear freshwater streams	--/SC	P
Central Valley steelhead	*Onchorhynchus mykiss*	Cold flowing water	T/T	C
Central valley spring-run chinook salmon	*O. tshawytscha*	Cold flowing water	T/T	P
Sacramento River winter-run chinook salmon	*O. tshawytscha*	Cold flowing water	E/E	P
Central Valley fall/late fall-run chinook salmon	*O. tshawytscha*	Cold flowing water	C/SC	C

Sources: CDFG 2009; USFWS 2009

Federal Status
E = Endangered
T = Threatened
C = Candidate for listing
-- = No listing

State Status
E = Endangered
T = Threatened
SC = California species of special concern
-- = No listing

Likelihood of Occurrence
U= Unlikely
P= Potential
C= Confirmed

River Lamprey (*Lampetra ayresi*)

River lampreys are a California species of special concern that may occur in the project area.

Life History and Habitat Needs

River lampreys are anadromous and belong to a primitive group of fish that resemble eels in form but do not have jaws and paired fins as eels do. The river lamprey has a round, sucker-like mouth, no scales, and breathing holes instead of gills. The species begins life in freshwater, travels to the ocean, and then returns to freshwater to spawn. Young are hatched, and then the young larvae drift downstream to areas of low velocity and with a sand or silt substrate. There they burrow and live as filter feeders for two to seven years, feeding on algae and detritus. As the larvae mature, they develop eyes and teeth and become free swimming. After becoming adults, they swim to the ocean (Natureserve 2009).

Adults are parasitic and feed on a variety of marine and anadromous fish. Adults typically attach to the back of the host fish and feed on muscle tissue. Feeding continues even after the death of the host fish (Moyle 2002).

After three to four months in the open ocean, adults begin to migrate back to spawning areas in the autumn. Spawning begins around February and may continue as late as May. Typical spawning areas contain gravel bottomed streams at the upstream end of riffle habitat, typically upstream of larvae habitat. After eggs are laid and fertilized, adult lampreys die within days (Moyle 2002).

Population Status and Recent Trends

The distribution of the river lamprey in California is largely unknown, but is presumed to be widely distributed in northern California, and their southernmost limit is likely the Sacramento River basin (County of Sacramento, DERA 2006a). In California, most catch records are for the lower Sacramento-San Joaquin River system, but efforts to find them in other watersheds have been minimal (Moyle 2002). They are present in the Napa River, Sonoma and Alameda Creeks, tributaries to the San Francisco Bay, and the lower Sacramento and San Joaquin Rivers, especially the Stanislaus and Tuolumne Rivers.

CDFG designated the river lamprey as a species of special concern in 1995. While trends of this species are relatively unknown in California, it is likely that populations are declining. This determination is made because the Sacramento, San Joaquin, and Russian Rivers and their tributaries have been severely altered. Moyle (2002) suggested that river lampreys are easy to overlook, so their abundance may be greater than indicated. According to the CDFG, river lampreys cannot be effectively managed until more is known about this species and it needs.

Presence in the Project Area

Little information exists on the status of the river lamprey in the project area. A similar species, the Pacific lamprey (*L. tridentata*) is known to use the American River and has been observed in the project area (Hannon 2009). Pacific lamprey redd (nest) counts in the lower American River have been as high as 350 in 2002 and as low as 1 in 2007 (Hannon and Deason 2007).

Central Valley Steelhead (*Onchorhynchus mykiss*)

Steelhead trout are a federally and state listed threatened species and are known to occur in the project area. This species is one of the principle anadromous salmonids in the Sacramento-San Joaquin River and Delta system.

Life History and Habitat Needs

Steelhead typically are classified into two races, winter and summer, based on when they begin their upstream migration. The steelhead in the project area are considered winter-run steelhead (McEwan and Jackson 1996). They begin their spawning migration in fall and winter, with peak migration from November to December (McEwan and Jackson 1996). Adult females excavate redds and lay their eggs in coarse gravels in the riffles. Unlike the chinook salmon, adult steelheads do not die after spawning but return to the ocean and spawn again in later years (County of Sacramento, DERA 2006a). Water passes through the gravel, aerating the eggs and newly hatched fry. Survival of developing eggs depends on streamflow, gravel quality, and silt load. After the yolk sac is absorbed, fry emerge to rear where they live in small schools in shallow water along stream banks. As the fry grow, they establish feeding territories. Young steelhead are opportunistic feeders and take a wide variety of terrestrial and aquatic insects and some crustaceans.

Juvenile steelhead remain in freshwater for one to three years before emigrating to the ocean, typically in the spring. Once in marine environments, steelhead rapidly grow, feeding on other fish. Adults may remain in the ocean for one to four years before returning to natal streams to spawn as two- to four-year-old adults.

Population Status and Recent Trends

Populations of Central Valley steelhead trout are at much lower levels than were found historically (McEwan 2001a). Estimates for the combined total run of steelhead in the Central Valley and San Francisco Bay in the 1950s was estimated at 40,000 (McEwan and Jackson 1996). Estimates for the Central Valley in the 1960s had dropped to 27,000, and by the early 1990s that number had dropped to less than 10,000 (McEwan and Jackson 1996). Population declines have been attributed to blockage from upstream habitats (e.g., dams), entrainment from unscreened diversions, hatchery practices, and degraded habitat conditions due to water development and land use practices. Dams at low elevations on all major tributaries block access to an estimated 95 percent of historical spawning habitat in the Central Valley.

Steelhead spawning surveys were conducted in the American River in 2007 and 2009 (Hannon and Deason 2007; See and Chase 2009). The 2007 survey, conducted between December and April, found 178 redds and 429 adult steelhead over approximately 18 miles, from Nimbus Dam to Paradise Beach. The 2007 population estimate, based on redd counts, was 186 to372 in-water spawners, while the population estimate, based on observations of adult steelhead, was 504 in-river spawners (Hannon and Deason 2007). The 2009 survey, conducted from February through March, found 96 redds over 14 miles, from Nimbus Dam to Watt Avenue, 72 of which were observed just downstream of the Nimbus Hatchery at Sailor Bar, and 50 adult steelhead were observed (See and

Chase 2009). Based on redd counts, the minimum population estimate in 2009 was 105 to 210 steelhead.

NMFS designated critical habitat for the Central Valley steelhead on September 2, 2005 (NMFS 2005). The critical habitat designation includes the project area.

Presence in the Project Area

Steelhead reared at the Hatchery are considered to be American River winter-run steelhead and are not a listed species, a candidate species for listing, nor a species of concern. Hinze et al. (1956) reported that, based on counts from 1943 to 1947, steelhead passed the area of Folsom during every month except August and September, and the most the run was during May and June. This suggests that the river may have supported a spring run of summer steelhead in addition to other seasonal runs of steelhead. McEwan (2001b) reported that presently, only California north coast drainages support runs of summer steelhead, and Central Valley drainages support only winter-run steelhead.

Specific information on the status of indigenous American River steelhead is lacking. As a result, NMFS considers all steelhead that spawn naturally in the lower American River to be Central Valley steelhead.

Steelhead migrating up the American River are directed from the river into the Hatchery via a fish ladder. A few steelhead get through the diversion dam to the area between the weir and the dam. During steelhead redd surveys, 10 redds were observed upstream of the weir in 2003, 9 redds in 2004, 6 in 2005, and 5 in 2007 (Hannon and Deason 2007). These redds were concentrated in the riffle at the northeast corner of Nimbus Shoals (Hannon and Deason 2007). Some redds probably were not documented in the main channel when flows were greater than 2,500 cfs. Based on snorkel surveys conducted by Reclamation, the character of the substrate in the riffle extends into deeper water to the North (Hannon and Deason 2007). Upstream of the weir in the stilling basin the gravel being used by most of the steelhead for spawning is large, making it difficult for the steelhead to dig a sufficiently deep redd; as such, this area has not historically supported spawning. Recent redd surveys confirm that the area downstream of the weir is being used for spawning; this is in part due to gravel augmentation activities in 2008 and 2009 (See and Chase 2009).

Steelhead returns to the Hatchery are highly variable from year to year, ranging from several hundred to several thousand. From 1999 to 2003, the average number of steelhead trapped at the Hatchery has been 3,408. Of the steelhead that enter the Hatchery, the production goal annually is 430,000 yearlings. From 1997 to 2006, over 18 million eggs were collected from 3,656 females, and the goal of releasing 430,000 yearlings has generally been met (Lee and Chilton 2007a). As steelheads do not die after spawning, eggs are collected and then the fish are released back into the American River downriver of the current weir and fish ladder entrance.

Figure 3-2 shows the number of adult steelhead entering the Hatchery from 1955 to 2006 (Lee and Chilton 2007a).

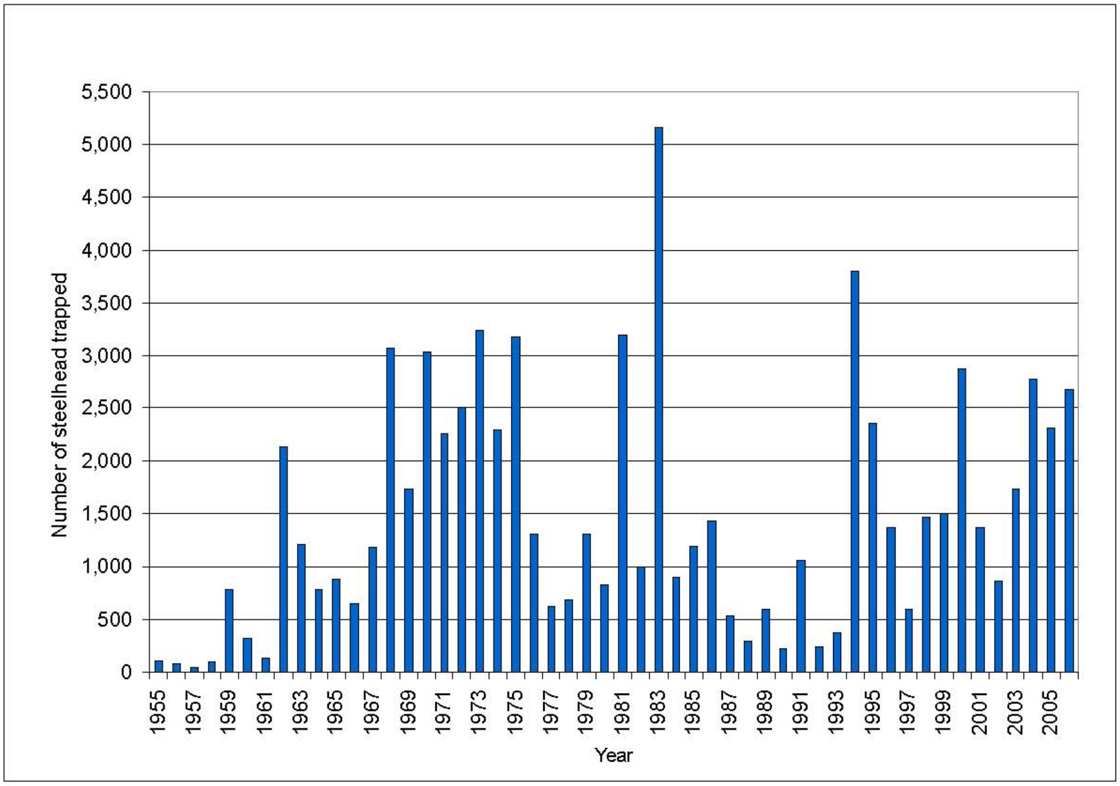


Figure 3-2: Number of steelhead trapped in the Nimbus Fish Hatchery, 1955-2006.

Central Valley Spring-run Chinook Salmon (*O. tshawytscha*)

The Central Valley spring-run chinook salmon is a federal and state listed threatened species.

Life History and Habitat Needs

Central Valley spring-run chinook salmon begin their adult migration to spawning sites from late March into July. These salmon migrate upstream in cold water habitats and then spawn from August to October, with peak spawning occurring in September. Eggs incubate from mid-August through mid-March, with rearing and emigration occurring from mid-August through April. Chinook salmon require cold freshwater streams, with suitable gravel for reproduction. Females deposit their eggs in nests in gravel-bottomed areas of relatively swift water. Preferred spawning gravel size is 50 to 125 millimeters (2 to 5 inches) in diameter. Water temperatures of 39° F to 57° F ensure maximum survivability of the incubating eggs and larvae.

After emerging, fry seek shallow nearshore habitat with slow water velocities and move to progressively deeper and faster water as they grow. Spring-run juveniles frequently reside in freshwater habitats for 12 to 16 months, but many young may migrate to the ocean within five to eight months after hatching. Chinook salmon spend two to four years maturing in the ocean before returning to natal streams to spawn. All adult chinook salmon die after spawning (Moyle 2002).

Population Status and Recent Trends

Historically, this species was one of the most abundant and widely distributed salmon races. The Central Valley drainage as a whole has supported spring-run chinook salmon runs as large as 600,000 fish between the late 1880s and the 1940s (CDFG 1998). This race once migrated into the headwaters of the tributaries to the Sacramento and San Joaquin Rivers. Out of the estimated seventeen runs where the Central Valley spring-run chinook salmon once occurred, it now spawns only in the main portion of the Sacramento River and its tributaries, Mill, Deer, Clear, and Butte Creeks and in the Yuba River (Lee and Chilton 2007a, Purdy 2010). The recent five-year mean abundance for the remaining three extant populations remains low (500 to 4,500 spawners), but the productivity trends are increasing over 1980 levels.

In addition to naturally occurring spawning, the Central Valley spring-run chinook salmon is augmented by the Feather River Hatchery, which completely supports the Feather River population of this evolutionary significant unit (ESU). Past hatchery management strategies may have resulted in some hybridization between this population and fall-run chinook salmon (Lee and Chilton 2007a).

Spring-run chinook salmon populations have declined due to such reasons as gold mining and agricultural diversions, loss of habitat in upper elevation headwaters blocked by dams, degradation of habitat conditions (e.g., water temperatures), entrainment in water diversions, and overharvest. The human-caused factor that has had the greatest impact on spring-run chinook salmon is the loss of habitat, particularly in the rivers upstream of the Sacramento Delta. Major dams have blocked upstream access to most spring-run chinook salmon, and smaller dams can contribute to migration delays.

Presence in the Project Area

As the Nimbus weir is installed and operates from mid-September to mid-December, spring-run chinook salmon are not collected at the Hatchery. Spring-run chinook salmon do not spawn in the lower American River, but juveniles do rear in the lower portions of the river (Hannon 2009).

Sacramento River Winter-Run Chinook Salmon (*O. tshawytscha*)

The Sacramento River winter-run chinook salmon is a federally and state listed endangered species. This population includes all naturally spawned populations of winter-run salmon in the Sacramento River and its tributaries, including two artificial programs: winter-run chinook salmon from the Livingston Stone National Fish Hatchery and winter-run chinook salmon in captive broodstock programs maintained at Livingston Stone National Fish Hatchery and the University of California Bodega Marine Laboratory.

Life History and Habitat Needs

The life history for the Sacramento River winter-run chinook salmon is similar to the spring-run salmon, the differences being when migration and spawning occurs. Winter-run salmon migrate from the ocean to spawning areas from December to July, with peak migrations in March. The spawning period occurs from late April to early August, with juveniles emerging from July to October. Juveniles typically stay in the freshwater streams for five to ten months before migrating to the ocean (Moyle 2002).

Population Status and Recent Trends

Run sizes for this ESU of chinook salmon have dropped from nearly 120,000 fish in 1969 to 191 to 1,200 fish in recent years, with an average of 600 fish (Moyle 2002). This ESU is represented by a single extant population. Construction of the Shasta and Keswick Dams near Redding completely displaced this ESU from its historic spawning area. In addition to barring access to the historic spawning areas, the Shasta Dam merged at least four independent populations into a single population, which further threatened this ESU by substantial loss of genetic diversity, life-history variability, and local adaptation. Low population numbers in the 1990s have resulted in a genetic bottleneck for the remaining population, which further reduced its genetic variability. These dams currently release cold water to maintain spawning areas. Productivity and abundance of the naturally spawning component of this ESU has improved in recent years, compared to the low numbers in the 1980s and early 1990s (Lee and Chilton 2007a).

Two programs have been used to aid in improving numbers for this ESU. The first is the captive broodstock program at the Livingston Stone National Fish Hatchery (the University of California’s Bodega Marine Laboratory has ceased, due to increasing numbers of this ESU). The second is an artificial propagation program, also at the Livingston Stone National Fish Hatchery, which is continuing.

Presence in the Project Area

As the Nimbus weir is installed and operates from mid-September to mid-December, winter-run chinook salmon are not collected at the Hatchery. Winter-run chinook salmon do not spawn in the lower American River, but juveniles do rear in the lower portions of the river (Hannon 2009).

Central Valley Fall/Late Fall Chinook Salmon (*O. tshawytscha*)

The Central Valley fall/late fall chinook salmon is a candidate for federal threatened status and a California species of special concern. The portion of the lower American River within the project area (up to Nimbus Dam) is essential fish habitat for the fall-run chinook salmon for spawning and rearing, as designated in 1999 by the Magnuson-Stevens Act. Because the fall and late fall-run chinook salmon are not federally listed, there is no critical habitat designated for this run. Fall/late fall chinook salmon historically inhabited the entire Sacramento-San Joaquin watershed. Current upstream habitat is limited by fish barriers (e.g., dams) on many rivers and streams.

Life History and Habitat Needs

Central Valley fall-run salmon typically migrate to natal streams from July through December, with the late-fall runs occurring from mid-October to mid-April. Peak spawning for fall-run chinook occurs in October and November, and rearing and emigration occurs from January through June. In contrast, the late-fall chinook has peak spawning February and March and rearing and emigration from April through mid-December. As with other races of salmon, water temperature determines spawning success. Early spawning success is typically low if the water temperature in early

November is above 60° F. Redds are excavated in coarse gravels in riffles for egg laying. Female chinooks guard their redds for 4 to 25 days before dying.

Juvenile salmon spend two to four years in the ocean before returning to natal areas to spawn and die (Moyle 2002).

Population Status and Recent Trends

Many factors have contributed to the population declines of the Central Valley fall/late fall chinook salmon. These are loss and degradation of spawning and rearing habitat, alteration of streamflows, overharvest, entrainment into water diversions, blockage of migration routes, exposures to toxins, and possibly loss of genetic variability from interbreeding with hatchery stocks. The human-caused factor that has likely had the greatest impact on chinook salmon has been the loss of habitat. Dams can either entirely block or delay migration. Harvest rates on wild stocks are a potential cause of population declines as well. Ocean harvest indices (percent of population harvested) range from 50 percent to 79 percent.

The main stressors for chinook salmon in the American river include altered flow regimes, high water temperatures, hatchery operations, and reduced habitat complexity and diversity.

Presence in the Project Area

In the American River, escapement (the portion of an anadromous fish population that escapes the commercial and recreational fisheries and reaches the freshwater spawning grounds) has varied widely. Estimated escapement from 1944 through 1952 before construction of Nimbus Dam averaged 25,948 individuals and ranged from approximately 12,000 to 38,656 (USFWS and CDFG 1953). Since 1952 the average escapement has been approximately 42,000 individuals and has ranged from approximately 6,400 to 110,900. In recent years, escapement has exceeded 100,000 (Kano 2006). Each fall, the Hatchery takes approximately 10,000 adult fall-run salmon with an annual goal of harvesting eight million salmon eggs and releasing four million smolt per year (Lee and Chilton 2007b). Over the last ten years, the Hatchery has trapped an average of 10,181 salmon and has released an average 5,667,267 salmon a year (2,998,335 fingerlings and 2,668,932 smolts). All chinook salmon collected at the Hatchery are euthanized, and no trapped salmon are returned to the American River (Lee and Chilton 2007b). Figure 3-3 shows the number of fall-run chinook salmon estimated in the American River and the number entering the Hatchery (Lee and Chilton 2007b).

The rest of the salmon spawn in the river or die before spawning (including being caught by anglers). Those salmon that reach the diversion weir and do not enter the hatchery are thought to ultimately drop back downstream and spawn there. A few may make it past the weir and the entrance to the Hatchery to the stilling basin, but there is little suitable spawning habitat in this area.

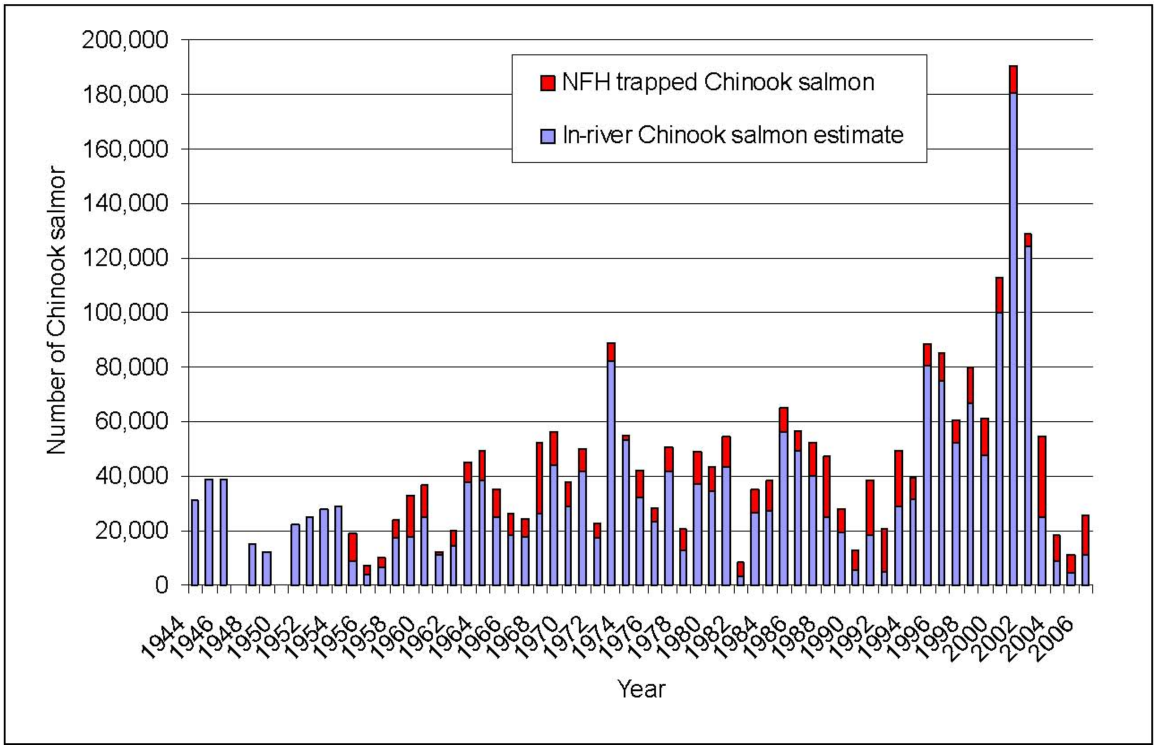


Figure 3-3: Number of fall-run chinook salmon in the lower American River and entering the Nimbus Fish Hatchery.

3.1.4 Invasive Species

An invasive species of concern is the NZMS. This species is native to New Zealand and its adjacent islands but has been observed in the western United States since 1987, when it was first identified near Hagerman, Idaho. Since then, it has spread to nine western states (Proctor et al. 2007).

This species of snail is small, typically less than 5 millimeters (two-tenths of an inch) in size, and reproduces sexually and asexually. In the western United States, males are extremely rare and nearly all of the reproduction is thought to occur asexually. Female NZMS are able to reproduce at three to six months and may have up to 78 embryos. When reproducing asexually, all offspring are genetically identical to the female. The ability to produce large amounts of offspring and to clone itself has allowed the NZMS to spread rapidly. Once established in an area, the NZMS is able to form dense colonies of anywhere from 1,800 NZMS per cubic meter (1.3 cubic yards) to up to 500,000 NZMS per cubic meter. Densities are highest in the summer and lowest in the winter (Proctor et al. 2007).

The ability of the NZMS to form dense colonies has allowed it to out-compete native species of gastropods (mollusks, such as snails and slugs), thereby potentially reducing gastropod diversity. This competition with native species may occur from either interference (direct aggressive encounters, such as for space) and exploitation (such as for resources). In addition, NZMS could affect other grazing macroinvertebrates (animals without a backbone that can be see without a microscope). For example, studies have shown that NZMS have negatively affected the growth of mayfly species. These impacts could reduce the quantity and quality of food resources for the fish species in the area. While trout and other fish species may eat NZMS, they may gain little energy from these feedings as the NZMS are able to pass through the digestive canal of trout alive and intact. Additionally, it has been shown the NZMS offer little or no energy, when compared to other common food items (Proctor et al 2007). In addition to the NZMS's ability to reproduce rapidly, another reason for its spread is its broad environmental tolerance. This species can be found in a variety of aquatic habitat types, including diverse temperatures, osmotic, flow, and disturbance regimes (Proctor et al. 2007).

The NZMS was found in an area upstream of the USGS gaging station cable crossing in 2008 (CDFG 2008a). It is possible for anglers walking or fishing in this area to spread the NZMS to other locations on the river, notably to Lake Natoma, which would result in contamination of a portion of the water supply.

Although the American River Trout Hatchery employs strict biosecuirty measures, infestation is a possibility. Infestation of the American River Trout Hatchery is a serious concern. Rainbow trout from this hatchery are used to stock many lakes and reservoirs in and around Sacramento. Because these trout are being introduced to areas upstream from anadromous waters, where the CDFG surveys have not detected the presence of NZMS, if the hatchery became infested, the CDFG would not be able to stock trout until they found a way to completely disinfect the hatchery or moved it to a new location. Infestation of the Nimbus Hatchery is less of a concern because its fish are returned to anadromous waters where the NZMS has already been found.

3.1.5 Regulatory Framework

Management of fish that spend most of their lives in freshwater is the responsibility of the USFWS, while species that spend most of their lives in marine environments (most anadromous species) are the responsibility of the NMFS. The CDFG is a state "trustee agency" for aquatic species under CEQA. Sensitive aquatic resources are regulated by the federal ESA and the CESA.

The following section is a discussion of laws and regulations related to fisheries and aquatic resources in the project area.

Federal Endangered Species Act

The federal ESA requires that both the USFWS and the NMFS maintain lists of threatened and endangered species. Endangered species are those that "are in danger of extinction throughout all or a significant portion of their range," while threatened species are "any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 USC, Section 1532). Section 9 of the ESA makes it illegal to "take" any endangered species of fish or wildlife and most threatened species of fish or wildlife (16 USC, Section 1538). Take is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct."

Section 7 of the ESA requires that all federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of habitat critical to such species' survival and recovery. To ensure against jeopardy, each federal agency must consult with the USFWS or the NMFS, or both, regarding the agency's actions. Consultation is initiated when the federal agency determines that its action may affect a listed species and submits a written request for initiation to the USFWS or the NMFS, along with the agency's assessment of its proposed action. If the USFWS or the NMFS concurs with the action agency that the action is not likely to adversely affect a listed species, the action may be carried out without further review under the ESA. Otherwise, the USFWS or the NMFS, or both, must prepare a written biological opinion describing how the agency action will affect the listed species and its critical habitat.

Section 7 of the ESA also requires that federal agencies consult with the USFWS or the NMFS on any actions that may destroy or adversely modify critical habitat. Critical habitat is defined as the specific areas within the species' occupied geographic range, at the time it is listed, in accordance with the provisions of Section 4 of the ESA, on which are found those physical or biological features that are essential to the conservation of the species and that may require special management considerations or protection; and specific areas outside the geographical area occupied by the species at the time it is listed, in accordance with the provisions of Section 4, upon a determination by the Secretary of Interior that such areas are essential for the conservation of the species (16 USC, Section 1532). NMFS' jurisdiction under the ESA is limited to marine and most anadromous species (sea turtles are jointly managed by the USFWS and the NMFS). Terrestrial and freshwater species are under USFWS jurisdiction.

California Endangered Species Act

The CESA (Fish and Game Code, Section 2050 to 2097) is similar to the federal ESA. California's Fish and Game Commission is responsible for maintaining lists of threatened and endangered species under the CESA, which prohibits the take of listed and candidate (petitioned to be listed) species. Under California law, take is defined as to "hunt, pursue, catch, capture, kill or attempt to hunt, pursue, catch, capture, or kill" (California Fish and game Code, Section 86).

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act established a management system for national marine and estuarine fishery resources. This legislation requires that all federal agencies consult with the NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect "essential fish habitat (EFH)." EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Magnuson-Stevens Act states that migratory routes to and from anadromous fish spawning grounds are considered EFH. The phrase "adversely affect" refers to the creation of any impact that reduces the quality or quantity of EFH. Federal activities that occur outside of EFH but that may have an impact on EFH must be considered in the consultation process. Under the Magnuson-Stevens Act, effects on habitat are managed under the Pacific Salmon Fishery

Management Plan and also must be considered. The Pacific Salmon Fishery Management Plan guides the management of commercial and recreational fisheries within the exclusive economic zone (3 to 200 miles offshore) off Washington, Oregon, and California.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 USC, Section 661 et seq.) requires federal agencies to consult with the NMFS and with state fish and wildlife resource agencies before undertaking or approving water projects that control or modify surface water. The purpose of this consultation is to ensure that fish and wildlife receive equal consideration with other purposes of water resources development projects. The consultation is intended to promote the conservation of fish and wildlife resources and to provide for the development and improvement of fish and wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to fully consider recommendations made by USFWS, NMFS, and state fish and wildlife resources agencies in project reports and to include measures to reduce impacts on fish and wildlife in project plans.

3.2 Biological Resources

This section is a description of the biological resources within the proposed project area. The discussion of biological resources includes vegetation, wildlife, wetlands and sensitive habitats, and special status species that are found or are potentially found within the project footprint. Each of these resources is discussed in this section.

The region of influence for biological resources includes the project area and a surrounding 250-foot buffer area of contiguous habitats that could be affected by the proposed activities. This buffer is included to account and for indirect impacts on vegetation and habitat.

This evaluation is based on the following:

- A reconnaissance field survey conducted by EDAW biologists on May 10, 2004;
- A wetland delineation conducted by North State Resources in September 2007;
- An elderberry shrub inventory of the Nimbus Shoals area conducted by Reclamation on May 27, 2008 and July 14, 2010;
- A site visit conducted by Tetra Tech biologists on November 17, 2009;
- Searches of the California Natural Diversity Database (CNDDB) (CDFG 2009);
- California Native Plant Society (CNPS) rare plant inventory (CNPS 2009); and
- A species list for potentially occurring federally listed species within the Folsom USGS 7.5-minute quadrangle (USFWS 2009) (Table 3-2).

Also reviewed were lists encompassing potentially occurring species in Sacramento County. Due to its proximity to the project area, the Hazel Avenue Widening Project EA (County of Sacramento, DERA 2006a) and EIR (County of Sacramento, DERA 2006b) were reviewed to identify any additional special status species that may occur within the project area.

Federal, state, and other regulations pertaining to the protection of biological resources in California and at the project area are included in Section 1.7.

The project area is between the Hatchery and Nimbus Dam. Habitat types are riparian forest/scrub, open water habitat, gravel bar, pond/freshwater marsh, oak woodland, and ruderal/annual grassland. Each habitat type is described below.

Table 3-2
Sensitive Plant or Wildlife Species in or Potentially in the Folsom USGS 7.5-Minute Quadrangle

Scientific Name	Common Name	Preferred Habitat	Federal/ State/CNPS Status	Likelihood of Occurrence in the Action Area
Plants				
Juglans hindsii	Northern California black walnut	Riparian woodland	--/--/1B.1	U
Sagittaria sanfordii	Valley sagittaria	Marshes and swamps	--/--/1B.2	P
Orcuttia viscida	Sacramento Orcutt grass	Vernal pools	E/E/1B.1	U
Clarkia biloba ssp. *brandegeeae*	Brandegee's clarkia	Chaparral and foothill woodland	--/--/1B.2	U
Navarretia myersii ssp. *myersii*	Pincushion navarretia	Vernal pools	--/--/1B.1	U
Invertebrates				
Branchinecta conservatio	Conservancy fairy shrimp	Vernal pools	E/--/--	U
B. lynchi	Vernal pool fairy shrimp	Vernal pools	T/--/--	U
Lepidurus packardi	Vernal pool tadpole shrimp	Vernal pools	E/--/--	U
Linderiella occidentalis	California fairy shrimp	Vernal pools	--/**/--	U
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	Blue elderberry shrubs	T/--/--	P
Amphibians				
Rana aurora draytonii	California red-legged frog	Riparian vegetation near slow-moving water	T/SC/--	U
Spea hammondii	Western spadefoot	Vernal pools and grasslands	--/SC/--	U
Ambystoma californiense	California tiger salamander	Vernal pools and underground refugia	T/--/--	U
Emys (=Clemmys) marmorata marmorata	Northwestern pond turtle	Permanent or nearly permanent water in a variety of habitats	--/SC/--	P
Reptiles				
Thamnophis gigas	Giant garter snake	Freshwater marshes and low gradient streams	T/T/--	U
Fish				
Hypomesus transpacificus	Delta smelt	Cold flowing water	T/T/--	U
Lampetra ayresi	River lamprey	Clear freshwater streams	--/SC/--	P
Onchorhynchus mykiss	Central Valley steelhead	Cold flowing water	T/T/--	C

Table 3-2
Sensitive Plant or Wildlife Species in or Potentially in the Folsom USGS 7.5-Minute Quadrangle

Scientific Name	Common Name	Preferred Habitat	Federal/ State/CNPS Status	Likelihood of Occurrence in the Action Area
O. tshawytscha	Central Valley spring-run chinook salmon	Cold flowing water	T/T/--	P
	Sacramento River winter-run chinook salmon		E/E/--	P
	Central Valley fall/late fall-run chinook salmon		C/SC/--	C
Birds				
Accipiter cooperii	Cooper's hawk	Riparian woodlands	--/**/--	P
Buteo swainsoni	Swainson's hawk	Tall trees near open areas	--/T/--	P
Phalacrocorax auritus	Double-crested cormorant	Tall trees near open water	--/**/--	P
Falco columbarius	Merlin	Trees near open areas	--/**/--	P
Ardea alba	Great egret	Large trees near open water	--/**/--	P
A. herodias	Great blue heron	Large trees near open water	--/**/--	P
Agelaius tricolor	Tricolored blackbird	Requires open water, protected nesting substrate, foraging area with insect prey	--/SC/--	P
Elanus leucurus	White-tailed kite	Dense-topped trees near open areas, such as grassland and water	--/**/--	P
Riparia riparia	Bank swallow	Riparian habitat	--/T/--	P
Mammals				
Antrozous pallidus	Pallid bat	Open, dry habitat with rocky areas for roosting	--/SC/--	U
Lasionycteris noctivagans	Silver-haired bat	Coastal and montane forest near open areas	--/**/--	P

1 Sources: CDFG 2009; USFWS 2009; CNPS 2009

<u>Federal Status</u>
E = Endangered
T = Threatened
C= Candidate
-- = No Listing

<u>State Status</u>
E = Endangered
T = Threatened
SC = California species of special concern
** = Tracked by the California Natural Diversity Database
-- = No Listing

<u>CNPS Status</u>
1B.1= seriously endangered in CA, rare or endangered elsewhere
1B.2= fairly endangered in CA, rare or endangered elsewhere
-- = No Listing

<u>Likelihood of Occurrence</u>
U= Unlikely
P= Potential
C= Confirmed

Wildlife use of the lower American River has been the subject of numerous studies and reports. Numerous bird species have been recorded along the lower American River, and many nest in the riparian habitats. In addition, the lower American River is used by many common mammals, reptiles, and amphibians and serves as an important wildlife movement corridor between the valley floor and the Sierra Nevada foothills.

The construction staging area would be in the Hatchery parking lot. A much smaller variety of wildlife is present because of the disturbed nature of the area, its lack of open water habitat, and adjacent development. Most wildlife in this area is expected to be passing through to use nearby suitable habitat.

3.2.1 Vegetation Communities

Riparian Forest/Scrub

Riparian forest is the dominant habitat type on the low terrace downstream of Nimbus Dam. The forest is dominated by an open overstory of Fremont cottonwood (*Populus fremontii*). Other trees in this habitat type include scattered black willows (*Salix gooddingii*), Oregon ash (*Fraxinus latifolia*), white alders (*Alnus rhombifolia*), sycamores (*Platanus racemosa*), interior live oaks (*Quercus wislizenii*), blue oaks (*Q. douglasii*), and one large fig tree (*Ficus caria*). Typical understory species include mule fat (*Baccharis salicifolia*), Himalayan blackberry (*Rubus discolor*), poison oak (*Toxicodendron diversilobum*), dutchman's pipe (*Aristolochia californica*), and coyote bush (*Baccharis pilularis*). Several blue elderberry (*Sambucus mexicana*) shrubs are present as well.

Dense stands of willow scrub are located along the water's edge on the low terrace downstream of Nimbus Dam. Characteristic species of this habitat type include sandbar willow (*Salix exigua*), arroyo willow (*S. lasiandra*), red willow (*S. laevigata*), and buttonbush (*Cephalanthus occidentalis*). Small patches of riparian scrub also occur along the south bank of the American River in the vicinity of the USGS cable, and scattered small alder trees are present along the north bank of the river between the USGS cable and Hazel Avenue.

A small patch of riparian wetland has been identified within the project area and is described below in Section 3.2.3, Wetlands.

Gravel Bar

Gravel bar habitat in the project area is restricted to those areas of the low terrace downstream of Nimbus Dam not covered by riparian forest or scrub. The gravel bar habitat is devoid of tree or shrub cover but supports a variety of weedy species, including fennel (*Foeniculum vulgare*), yellow star thistle (*Centaurea solstitialis*), Klamath weed (*Hypericum perfoliatum*), rose clover (*Trifolium hirtum*), hairy vetch (*Vicia villosa*), black medic (*Medicago polymorpha*), ripgut brome (*Bromus diandrus*), red brome (*B. madritensis* ssp. *rubens*), wild oats (*Avena fatua*), and soft chess (*Bromus hordeaceus*).

Wetlands and Sensitive Habitats

Wetlands and their associated vegetative communities are described below in Section 3.2.3, Wetlands.

Two sensitive habitat types are found within the project area: riparian forest/scrub and oak woodland, which are described in this section. Riparian habitat is a sensitive California natural community (CDFG 2009) since this habitat type has declined due to development and agriculture. It provides essential habitat for a large diversity of wildlife species, including migratory birds, and provides movement corridors for wildlife. Oak woodlands are sensitive due to habitat loss, low regeneration, and slow growth rates and because acorns are a valuable resource for many wildlife species.

Oak Woodland

Oak woodland is present at a slightly higher elevation above the low terrace near Nimbus Dam, in the vicinity of the low terrace access road. The overstory of the oak woodland is dominated by interior live oak, with some blue oak and valley oak as well. Elderberry shrubs are scattered throughout this habitat type. The grassy understory is composed of species characteristic of the annual grassland type described below.

Annual Grassland/Ruderal Areas

Annual grassland and ruderal areas occupy the banks of the American River between the USGS cable and the low terrace and along the hillside from the low terrace to Hazel Avenue. Common species include wild oats, ripgut brome, soft chess, redstem filaree (*Erodium botrys*), tarplant (*Hemizonia fitchii*), Bermuda grass (*Cynodon dactylon*), annual fescue (*Vulpia myuros*), torilis (*Torilis arvense*), and thistle in varying degrees of cover, depending on the level of disturbance. Riprap has been installed in some areas along the south bank of the American River.

3.2.2 Wildlife

The project area supports a variety of wildlife associated with woodland, grassland, riparian, wetland, and aquatic habitats. Species within the project area are likely to be those that are adapted to urban landscapes and human disturbance since the site is next to Hazel Avenue, a busy road, and is regularly used by anglers and recreationists.

Riparian habitat supports an abundance of wildlife due to the food, water, migration, and dispersal corridors and the thermal cover that they provide. Numerous resident and neotropical migratory bird species are associated with riparian communities. These may include the belted kingfisher (*Megaceryle alcyon*), downy woodpecker (*Picoides pubsecens*), black phoebe (*Sayornis nigricans*), bushtit (*Psaltriparus minimus*), western scrub-jay (*Aphelocoma californica*), spotted towhee (*Pipilo erythrophthalmus*), and song sparrow (*Melospiza melodia*). Aquatic amphibians and reptiles, such as the western aquatic garter snake (*Thamnophis couchi*), are also common. Mammals, such as mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), and gray fox (*Urocyon cinereoargenteus*), may occur (Mayer and Laudenslayer 1988).

Representative avian species that forage and rest in emergent wetlands and associated open water habitat include the pied billed grebe (*Podilymbus podiceps*), gulls (*Larus* spp.), terns (*Sterna* spp.), and other water fowl. Typical amphibians and reptiles in these habitats are the California newt (*Taricha torosa*) and garter snake (*Thamnophis sirtalis*).

Oak woodlands support a number of raptor species, including the red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and several owl species (*Megascops kennicottii, Bubo virginianus*). Other birds, such as the California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), northern flicker (*Colaptes auratus*), white-breasted nuthatch (*Sitta carolinensis*), and western bluebird (*Siala mexicana*), may also inhabit this community. Potentially occurring reptiles and mammals include the western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), California ground squirrel (*Spermophilus beecheyi*), coyote, striped skunk (*Mephitis mephitis*), and mule deer.

Annual grasslands are home to such species as horned lark (*Eremophila alpestris*), loggerhead shrike (*Lanius ludovicianus*), and vesper sparrow (*Pooecetes gramineus*). In addition, reptiles and mammals observed in this community type include the gopher snake, western rattlesnake (*Crotalus viridis*), garter snake, western fence lizard, coyote, mule deer, and California ground squirrel.

3.2.3 Wetlands

A wetland delineation was conducted in September 2007 (North State Resources 2007). A total of 3.336 acres of waters of the US were delineated within the project area (Figure 3-4). This includes three types of wetlands totaling 0.579 acre—fresh emergent (0.381 acre), riparian (0.193 acre), and seasonal (0.005 acre)—and four “other waters” types—ephemeral drainage (0.007 acre, 150 linear feet), intermittent stream (0.004 acre, 95 linear feet), perennial stream (2.434 acres, 1,730 linear feet)—and open water (0.312 acre).

The project area supports two fresh emergent wetland features. One is along the bank of the American River and occupies 0.208 acre. Dominant vegetation within this area includes common rush (*Juncus patens*), redroot flatsedge (*Cyperus erythrorhizos*), and willow (*Salix* spp.). The second fresh emergent wetland is east of the bike trail in the central portion of the project area and occupies 0.173 acre. This feature is subject to perennial ponding and supports floating aquatic vegetation, including common duckweed (*Lemna minor*) and floating waterprimrose (*Ludwigia peploides*).

One riparian wetland was identified within the eastern project area at the base of the slope descending from Hazel Avenue. This feature occupies 0.193 acre and supports a riparian vegetation community, including Fremont cottonwood, willow, Himalayan blackberry, common rush, and dallisgrass (*Paspalum dilatatum*).

One seasonal wetland was identified within the project area and occupies a total of 0.005 acre. It is within the floodplain of the American River in the eastern project area. This

Wetland
Open Water
Perennial Stream/Other Waters

Wetlands in the Project Area

Nimbus Hatchery Fish Passage Project

Figure 3-4

feature consists of a small localized depression that supports hydrophytic (water-dependent) vegetation, including barnyard grass (*Echinochloa crus-galli*) and flatsedge (*Cyperus* sp.).

One ephemeral drainage was identified just north of the Hatchery and is characterized as an approximately two-foot-wide channel that carries stormwater runoff to the American River during and briefly after storms. The feature occupies 0.007 acre (150 linear feet) of the project area.

One intermittent stream was identified in the southeast portion of project area, just north of the parking lot for the CSUS Aquatic Center. This feature is characterized as an approximately two-foot-wide channel that carries stormwater and urban runoff to the American River. The feature occupies 0.004 acre (95 linear feet) of the project area.

One perennial stream was identified in the project area. This feature corresponds to reaches within the Ordinary High Water Mark (OHWM) of the American River, from just downstream of the Nimbus Dam to the Hatchery weir. Patches of riparian woodland and riparian scrub vegetation occur within the OHWM along the bank of the American River. The American River converges with the Sacramento River approximately 22 miles downstream of the project area.

One open water feature was identified in the project area, along the floodplain of the American River. This feature is characterized as a depressional area that is subject to intermittent/perennial ponding. During the dry season the extent of ponding is reduced. However, much of the open water feature is ponded year-round and the western extent of the feature supports emergent wetland vegetation, including needle spikerush (*Eleocharis acicularis*), common rush, Rocky Mountain rush (*Juncus saximontanus*), redroot flatsedge, cattail, and parrot's feather (*Myriophyllum aquaticum*). The open water area occupies 0.007 acre (150 linear feet) of the project area.

3.2.4 Special Status Plant Species

Federally Listed Plant Species

Sacramento Orcutt grass (*Orcuttia viscida*) is the only federally listed plant species that may occur or that could occur within the Folsom USGS quadrangle (Table 3-2). This species requires vernal pool habitat, which is not present within the project area. As such, it is considered unlikely to occur.

There is no designated critical habitat present for any federally listed plant species.

State-listed Plant Species

No state listed plant species are considered to have the potential to occur in the Folsom USGS quadrangle.

Other Special Status Plant Species

Two CNPS list 1B plants could occur within the Folsom USGS quadrangle: Brandegee's clarkia (*Clarkia biloba* ssp. *brandegeeae*) and pincushion navarretia (*Navarretia myersii* ssp. *myersii*). Two additional CNPS 1B species from the Sacramento County CNDDB list are considered to have the potential to occur: northern California black walnut (*Juglans hindsii*) and valley sagittaria (*Sagittaria sanfordii*). Of these, northern California black walnut and valley sagittaria are the only species with potential habitat in the project area.

Northern California black walnut is a native deciduous tree growing in riparian woodland and scrub at elevations ranging from sea level to 1,452 feet. Native stands of California black walnut occur only in Napa and Contra Costa Counties and are considered rare, but hybrids with cultivars of walnut are widely naturalized in cismontane California (CNPS 2009). No walnut trees were observed in the project area, and the species is not expected to occur.

Valley sagittaria is a perennial emergent herbaceous species that grows in shallow water habitat associated with marshes and swamps. The small stands of freshwater marsh occurring around the fringes of the ponds and along portions of the bank of the American River may provide suitable habitat for valley sagittaria. However, the potential for occurrence is low because valley sagittaria is considered mostly extirpated from the Central Valley (CNPS 2009), and the marshes on the site receive a fair amount of disturbance. However, the potential for this species to grow on the project area cannot be entirely dismissed because no protocol-level special-status plant surveys have been conducted on the project area.

3.2.5 Threatened and Endangered Wildlife Species

Fish species are addressed in Section 3.1, Fisheries.

Federally Listed Wildlife Species

Seven federally listed wildlife species have the potential to occur within the Folsom USGS quadrangle: conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool fairy shrimp (*B. lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California red-legged frog (*Rana aurora draytonii*), California tiger salamander (*Ambystoma californiense*), and giant garter snake (*Thamnophis gigas*).

None of these species are expected to inhabit the project area, except potentially the valley elderberry longhorn beetle, because there is no suitable habitat for them. The only known extant population of California red-legged frog in the project vicinity is in the Weber Creek watershed in El Dorado County (USFWS 2001, 2002). Due to the distance of extant populations from the project area, California red-legged frog is considered unlikely to occur.

The valley elderberry longhorn beetle is federally listed as threatened. This species depends on blue elderberry shrubs for food and reproduction. Approximately 19 elderberry shrubs have been identified in the project area, all at Nimbus Shoals (Figure 3-5). It is possible that elderberry shrubs in the project area are occupied by the valley elderberry longhorn beetle.

There is no designated critical habitat for any federally listed wildlife species.

State-listed Wildlife Species or State Species of Special Concern

Swainson's hawk (*Buteo swainsoni*) and bank swallow (*Riparia riparia*), both state listed as threatened, have the potential to occur within the project area

Swainson's hawks nest in riparian areas and oak savannahs that are next to grasslands or agricultural fields. Suitable habitat for this species exists in the riparian and oak woodland habitat within the project area. As such, this species has the potential to occur.

Bank swallow habitat occurs in open and partly open situations, frequently near flowing water. Nests are in steep sand, dirt, or gravel banks or in burrows dug near the top of the bank. Suitable habitat for this species can be found in the project area where the banks are steep. It is possible that bank swallows may occur within the project area.

Four state species of special concern have the potential to occur within the Folsom quadrangle: western spadefoot (*Spea hammondii*), northwestern pond turtle (*Emys marmorata*), tricolored blackbird (*Agelaius tricolor*), and pallid bat (*Antrozous pallidus*). There is no potential habitat in the project area for the western spadefoot and pallid bat. As such, these species are considered unlikely to occur.

Northwestern pond turtles are associated with permanent or nearly permanent ponds, lakes, streams, irrigation ditches, or permanent pools along intermittent streams in a wide variety of habitat types. They require basking sites, such as partially submerged logs, rocks, vegetation, or open mud banks (CDFG 2009). Eggs are deposited in nests constructed in sandy banks or in hillsides. Suitable western pond turtle habitat is along the banks of the American River, including the edges of Nimbus shoals and downstream toward the USGS gaging station.

Tricolored blackbird breeding colonies have been commonly recorded in freshwater marshes dominated by tules (*Scirpus* spp.) and cattails. They have also been found in riparian areas composed of willows, blackberries, thistles, nettles (*Urtica* spp.), and mustard (*Brassica* spp.) (Hamilton 2004). As such, suitable nesting habitat for tricolored blackbirds exists in the riparian and wetland areas on-site, and the species has the potential to occur.

Other Special Status Wildlife Species

Other special status species are those tracked by the CNDDB due to rarity, restricted distribution, population decline, and threats to habitat. Potentially occurring species are California fairy shrimp (*Linderiella occidentalis*), Cooper's hawk (*Accipiter cooperii*), double-crested cormorant (*Phalacrocorax auritus*), merlin (*Falco columbarius*), great

Legend

Elderberry Locations

Buffer, 30 feet

TETRA TECH

Elderberry Locations

Nimbus Hatchery Fish Passage Project

Figure 3-5

egret (*Ardea alba*), great blue heron (*A. herodias*), white-tailed kite (*Elanus leucurus*), and silver-haired bat (*Lasionycteris noctivagans*). California fairy shrimp does not have suitable habitat within the project area, and is considered unlikely to occur.

Cooper's hawk, double crested cormorant, merlin, great egret, great blue heron, white-tailed kite and silver-haired bat all inhabit trees near open water. As a result, they have potential habitat within the project area, particularly in the riparian and oak woodland areas.

The project area contains potential nesting and foraging habitat for birds protected under the MBTA and EO 13186. In addition to the bird species described above, there is the potential for additional protected bird species to nest in the project area.

3.3 Recreation

The proposed project covers the Hatchery area and the Nimbus Shoals. The American River Parkway, west of Hazel Avenue, is operated by Sacramento County and the portion to the east of Hazel Avenue is operated by the State of California. This section describes recreation uses within and around the project area, as well as any recreation facilities directly or indirectly linked to the area.

3.3.1 Affected Environment

The project area is within the Folsom Lake State Recreation Area (SRA) and along the American River Parkway, which is popular as a multiuse waterway with boating, rafting, kayaking, hiking, jogging, bicycling, swimming, bird watching, and picnicking (Kiene 2008). The American River Parkway and the lower American River offer regionally important recreation opportunities. Recreation in the parkway system includes wildlife watching, cycling, jogging, and educational opportunities at nature areas, as well as access for angling and boating on the river (CDFG 2008d). Recreation opportunities and amenities available at the Hatchery are a visitor center, picnic area, parking for vehicles and bikes, access to the American River for fishing and to the Jedediah Smith Memorial Trail, and access to the American River Hatchery to observe trout.

Hatchery Visitor Center

The visitor center at the Hatchery provides guided tours and interactive exhibits about the biology of salmon, Hatchery operation, and river conservation. The visitor center and Hatchery ponds are open 7:30 AM to 3 PM daily, weekends and holidays included. Visitors can watch the egg-taking on the spawning deck of salmon and steelhead. Guided tours for schools are offered from November through March, and self-guided tours are available during the rest of the year. As presented in Table 3-3 below, an annual average of 85,000 people visit the Hatchery, mostly school groups and mostly during the American River Salmon Festival in mid-October.

In addition to viewing the egg-taking, visitors in the fall can see salmon in the river and steelhead in the hatchery ponds. In the winter, visitors can see steelhead in the river and young salmon in the ponds, as well as steelhead egg-taking one day per week. In the spring and summer, viewers can see American shad and striped bass in the river and birds and wildflowers along the river.

Table 3-3 Number of Visitors to the Nimbus Fish Hatchery

	2002/2003	2003/2004	2005/2006	2006/2007	2007/2008
Visitors	80,700	97,650	72,025	83,285	90,925

Source: CDFG 2008b

Fishing

The lower American River and particularly the portion of the river near the project area attracts anglers for the salmon, steelhead, and resident rainbow trout. Other species that could be caught in the American River are largemouth bass, channel catfish, striped bass, and American shad. Opportunities draw anglers to the area for both warm and coldwater game fish. Interest levels for trout and smallmouth bass angling have influenced the Fish and Game Commission to expand freshwater sportfishing regulations on the North Fork American River to allow fishing year-round. The Northern California Council of Federation of Fly Fishers has requested a temporary ban on steelhead fishing in the lower American River in 2009 due to the low water levels. Near the project area, most of the fish available for anglers to catch upstream of the weir are limited to the fish that moved upstream before mid-September, when the racks and pickets were installed. In the case of salmon, the fish are in a state of deterioration, and there is very little recruitment of fresh fish. The salmon run is primarily over by the end of December, when the racks and pickets are removed.

Some recreational anglers believe that there are too many closures and regulations imposed on them by the state and federal government. They believe that Reclamation should adopt water and flow temperature standards. Further, they believe that existing fish and game laws should be enforced (such as snagging), instead of new regulations being adopted. Anglers suggest that Reclamation provide funding to the state for CDFG wardens to patrol the river as mitigation for the impacts on the fisheries (Bacher 2008). Fishing along the river requires a license, a Bay-Delta enhancement stamp, and a steelhead card.

Boats

By county ordinance, boating of any kind is not allowed within 1,000 feet of Nimbus Dam, primarily to ensure public safety. Nevertheless, some boats are launched in this area and may become entrained on the weir or dashed against the piers. Boating is allowed on most of the lower American River below the weir, subject to local and seasonal restrictions. Motor-powered watercraft are allowed on the lower American River, except between November 1 and March 15 when there is a closure upstream from Hagan Park. The maximum speed limit on the entire lower American River is five miles per hour. There is a launching point for car-top drift boats on the northern shore of the river, northwest of the Hatchery (Fishsniffer 2008).

Trails

The trail that passes through the project area is part of the 32-mile Jedediah Smith National Recreation Trail. Multiple users of the trail include walkers and hikers, equestrians, bicyclists, and mountain bikers. Designated use of the trail at the level of the proposed project is for bicyclists and pedestrians. West of the project area, the Jedediah Smith National Recreation Trail is on the south side of the river and splits at Hazel Avenue; one section passes under the Hazel Avenue Bridge and the other crosses over the bridge. West of Hazel Avenue, the trail crosses the access road to the Hatchery; east of Hazel Avenue, the part of the trail that passes under the bridge crosses the access road to Nimbus Shoals.

The demand for trail access continues to increase, and with this demand comes a growing concern about conflicts between the different kinds of trail users, particularly on multiuse trails. Currently, there are 46 miles of pedestrian/equestrian trails within the SRA, 20 miles of multiuse trails, 16 miles of Class I trails, 9 miles of mountain bike/pedestrian trails, and 3 miles of pedestrian-only trails (2 miles of which are ADA accessible) (County of Sacramento, Planning and Community Development Department 2008).

Whitewater Rafting Facilities

Whitewater kayaking interests have periodically expressed the desire for a year-round artificial whitewater kayaking course using the drop from Lake Natoma around Nimbus Dam to the river downstream in the area of Nimbus Shoals. This concept was raised as part of the bid by the San Francisco Bay Area Sports Organizing Committee for the 2012 Olympics. While the Bay Area was unsuccessful in its bid, interest in the potential for an artificial whitewater kayaking course at Nimbus Dam has persisted, from such groups as the River City Paddlers, a Sacramento-based paddling group that sponsored a preliminary concept study of the idea. Also, whitewater kayaking interests have expressed a desire that the scope of Reclamation’s plan to replace the fish diversion structure be broadened to develop this structure as a multipurpose facility that would provide both fish passage and whitewater recreation.

Recreational Community Groups and Organizations

Several local and regional community groups are organized under the goal of protecting California rivers. Most of these organizations are concerned with issues related to degradation of lands and waters affecting fish, wildlife, and recreationists. Local groups, such as the Save the American River Association, are concerned with the degradation in salmon and steelhead runs, caused by flood control activities downstream of Folsom Dam.

Surrounding Recreational Areas

About half of the recreation on Lake Natoma is aquatic, such as paddling (kayaking, rowing, canoeing, outriggers), swimming, and fishing. In fact, Lake Natoma is considered one of the best rowing locations in the world, due in large part to the facilities available at the CSUS Aquatic Center and the major rowing competitions hosted by CSUS.

Motorized watercraft on Lake Natoma are limited to five mph. Nimbus Flat, to the east of the project area, is one of five major day-use areas that serve as the primary gateway within the SRA. Other visitor areas around Lake Natoma include the CSUS Aquatic Center and Negro Bar. The Aquatic Center obtains permits from State Parks to use Nimbus Flat to stage between eight and ten major events each year. The Aquatic Center, which is operated by CSUS under an agreement with CDPR, is home to the CSUS’s water ski and rowing teams and also offers a full range of public courses and programs in watercraft instruction and aquatic safety. Negro Bar includes a full range of visitor facilities, including a swim beach, landscaped picnic area, group campground, boat launch ramp, canoe/kayak concession, restrooms, and an equestrian staging area.

Secondary visitor areas on Lake Natoma include Willow Creek on the eastern shore and Lake Overlook and Mississippi Bar on the western shore. Each of the areas has limited facilities, but each provides water and trail access. The Willow Creek area includes a small picnic area, canoe and kayak concession, informal boat launch, vault toilets, and a small parking area. Lake Overlook, which provides sweeping views of Lake Natoma, the Sierra Foothills, and the Sacramento Valley, includes a paved parking lot and trailhead. Mississippi Bar, the largest of the three areas, occupies a flat river terrace between Lake Overlook and Negro Bar. The area includes several lagoons and ponds, some of which area accessible by canoe or kayak from Lake Natoma, as well as a heron rookery. Mississippi Bar represents a significant area of opportunity for future recreation and preservation (CDPR and Reclamation 2007).

Lake Natoma and the rest of the SRA provide a range of land-based recreation opportunities for visitors who are not aquatic enthusiasts, including picnicking, camping, walking, hiking, cycling, mountain biking, and horseback riding.

Other Regional Destinations

Several regional recreation facilities in this part of northern California offer similar recreation experiences. In addition to Folsom Lake, which is considered by the CDPR as a main part of the general plan with Lake Natoma, other reservoirs within a fairly easy drive of Sacramento include Lake Oroville to the north, Lake Berryessa to the west, and Lake Camanche to the south. Folsom Lake is ideal for a variety of aquatic activities, including boating, personal watercraft use, waterskiing, wake boarding, sailing, windsurfing, swimming, and fishing.

Lake Oroville has a visitor center, swim beach and picnic area, three formal boat launch areas, 210 developed campsites, and about six miles of trails.

Lake Berryessa has seven resorts around the reservoir that provide camping, day use, boating facilities, and food services.

Lake Camanche offers a full-service marina, boat rentals, and boat launch facilities. It also includes campsites, an RV park, housekeeping cottages, equestrian stables and trails, and day-use areas with picnic tables, barbeques, and food and equipment concessions.

Several smaller reservoirs are along the Interstate Highway 80 and Highway 50 corridors east of the project area. Facilities along Highway 50 are Jenkinson Lake, Ice House Reservoir, Union Valley Reservoir, and Loon Lake Reservoir. Facilities along Interstate 80 (I-80) include Lake Spaulding, Donner Lake, and Stampede Reservoir. Most of these reservoirs are on Forest Service lands and provide boat launch facilities and rentals, as well as a range of camping and trail facilities. However, access roads to most of these reservoirs are closed during the winter since they are at high elevations.

3.3.2 Regulatory Setting

Folsom Lake State Recreation Area

The following goals and guidelines are identified for Nimbus Flat and Shoals and Nimbus Dam in the Folsom Lake SRA and Folsom Powerhouse State Historic Park General Plan/Resource Management Plan Final EIS/EIR (CDPR and Reclamation 2009). Only items relevant to the project area are presented below.

NIMBUSFLAT-1: Ensure that special events do not exclude use by the general public during peak use times. Manage the number and size of special events permitted to minimize impacts on general public. During large special events, consider reserving a portion of the parking to ensure the continued access for SRA visitors not attending such events. This would likely require the expansion of the off-site parking and shuttle program across all special events.

NIMBUSFLAT-2: Improve the entrance to Nimbus Flat to traffic flow. This may include redesigning and relocating the entrance kiosk and adding lanes.

NIMBUSFLAT-3: Limit and control vehicle access to Nimbus Shoals—the gravel bar and riparian areas downstream of Nimbus Dam—by delineating a parking area and providing pedestrian access to the water.

NIMBUSFLAT-4: Provide for hand-launching paddling/rowing watercraft on the American River at Nimbus Shoals if the new fish diversion structure for the Nimbus Hatchery so permits.

NIMBUSFLAT-5: If opportunities arise, explore the potential to provide a dedicated bridge for trail users across the American River downstream of Nimbus Dam. Such a bridge would improve access between the bike paths on the north and south sides of Lake Natoma.

NIMBUSFLAT-6: Support the development of a fish passage channel across Nimbus Shoals that would allow fish to pass between the American River and the Nimbus Hatchery in a manner most beneficial to the fishery resource. The construction of the fish passage and removal of the in-stream diversion structure is a project of Reclamation and the CDFG.

NIMBUSFLAT-15: Support the creation of water features that are conducive to whitewater recreation in conjunction with removing the in-stream fish diversion structure in the American River and developing a naturalized fish passage channel across Nimbus Shoals.

NIMBUSDAM-1: Examine the potential for using Reclamation land west of Hazel Avenue across from the entrances to Nimbus Flat and the CSUS Aquatic Center for overflow parking during special events and other peak times.

NIMBUSDAM-2: Promote the construction of a multiuse trail bridge or separated path across the American River downstream of Nimbus Dam as part of the Hazel Avenue widening project.

Sacramento County General Plan

No policies in the Sacramento County General Plan directly relate to the Hatchery. The county has authority over land uses next to Lake Natoma within unincorporated Sacramento County. This is because Lake Natoma is part of the American River Parkway under the 1985 American River Parkway Plan. The county applies, as part of its zoning code, the Parkway Corridor Combining Zone within the Parkway to ensure land use compatibility and to reduce visual intrusion on natural amenities. Policies of the Sacramento County General Plan that could be related to the recreational impacts of the proposed project include locating development to minimize visual intrusion in areas of scenic and cultural value, such as the following:

- Recreation and historic areas;
- Scenic highways;
- Landscape corridors;
- State or federal designated wild and scenic rivers;
- Visually prominent locations, such as ridges, designated scenic corridors, and open viewsheds; and
- Native American sacred sites.

American River Parkway Plan

The parkway plan is a component of both the city and county general plans. The plan has authority over the land uses within the parkway, which extends from Folsom Dam to downtown Sacramento, at the confluence with the Sacramento River. The plan includes land use designations and policies that direct all recreation, restoration, preservation, and development of facilities and states the following:

> *In order to facilitate the coordination in the planning and management of the American River Parkway, it should be the responsibility of the respective State and county agencies to inform each other of any large scale public or private improvement proposals, request for entitlement of use, plans for large scale events, or proposed policy changes which would affect the Parkway.*
>
> *Area plans shall be reviewed by the County Recreation and Parks Commission when a physical change is proposed in the Parkway, to determine the appropriateness of the change.*

River Corridor Management Plan for the Lower American River

The 2001 River Corridor Management Plan institutes a cooperative approach to managing and enhancing the Lower American River's aquatic and terrestrial ecosystems, flood control systems, and recreation values within the framework of the 1985 American River Parkway Plan. The River Corridor Management Plan provides a significant foundation of policy and scientific research for updating the parkway plan. It also is used to inform resource managers and the community about the condition of American River Parkway Resources and the goals, objectives, and recommendations for improving resource conditions in a cooperative manner.

The Recreation Management Element of the River Corridor Management Plan includes specific recommendations on public access and trails, interpretation and education, land acquisition, adjacent land uses, public safety, public outreach, and operations and maintenance/recreation facilities. The River Corridor Management Plan is not legally binding and does not alter the mission, authority, or responsibility of any management entity, nor does it alter the status or use of the parkway plan.

Sacramento Area Council of Governments (SACOG)

The Sacramento Area Council of Governments (SACOG) is an association of local governments in the six-county Sacramento region. SACOG provides transportation planning and funding for the region and serves as a forum for studying and resolving regional issues. In addition to preparing the region's long-range transportation plan, SACOG approves the distribution of affordable housing in the region and assists in planning for transit, bicycle networks, clean air, and airport land uses.

SACOG's Regional Bicycle, Pedestrian, and Trails Master Plan guides the long-term decisions for the Bicycle and Pedestrian Funding Program, adopted by the SACOG Board of Directors in September 2003. The emphases of the bicycle and pedestrian plan and funding program are to provide facilities for walking and biking in the cities and towns of the region. The plan and program also connect cities and towns with the goal of integrating local plans to create a seamless regional bicycle and pedestrian system.

National Wild and Scenic Rivers Act

One of the dominant natural features within the project boundaries is the lower American River. This portion of the river is designed as a Recreational River by the Secretary of Interior under the National Wild and Scenic Rivers Act and is given the same designation by the State under the State Wild and Scenic system. The American River and associated parkway provide a public recreational resource of regional significance.

The designated reach is from Nimbus Dam to the Sacramento River, a distance of 23 miles. The NPS designated this reach as a Wild and Scenic River in 1981. The American River is further classified as "recreational" and is described as follows:

> *This short stretch of river, flowing through the city of Sacramento, is the most heavily used recreation river in California. It provides an urban greenway for trail and boating activities and is also known for its runs of steelhead trout and salmon.*

California Wild and Scenic Rivers Act

The California Wild and Scenic Rivers Act (Public Resources Code Sec. 5093.50 et seq.) was passed in 1972 to preserve designated rivers possessing extraordinary scenic, recreation, fishery, or wildlife values. The act provides a number of legal protections for rivers included within the system, beginning with the following legislative declaration (Sec. 5093.50):

> *It is the policy of the State of California that certain rivers which possess extraordinary scenic, recreational, fishery, or wildlife values shall be preserved in their free-flowing state, together with their immediate environments, for the benefit and enjoyment of the people of the state. The Legislature declares that such use of these rivers is the highest and most beneficial use and is a reasonable and beneficial use of water within the meaning of Section 2 of Article X of the California Constitution.*

3.4 Cultural Resources

This section is a discussion of the affected environment for cultural resources for the proposed project. Cultural resources include several categories of resources: archaeological resources, built-environment or architectural resources, landscapes of historic or cultural significance, and ethnographic resources significant to Native Americans such as sacred sites and traditional cultural properties (TCPs). Legally, cultural resources are defined as historic properties in the National Historic Preservation Act (NHPA); historical resources in CEQA; Native American sites, archaeological sites, districts, and objects that are eligible for listing on or that are now listed on the NRHP; cultural items, as defined in the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA); Native American, Native Alaskan, or Native Hawaiian sites for which access is protected under the American Indian Religious Freedom Act of 1978 (AIRFA); archaeological resources, as defined by the Archaeological Resources Protection Act of 1979 and Antiquities Act of 1906; and archaeological artifact collections and associated records, as defined by 36 CFR, Part 79.

The area of potential effects (APE) for this project incorporates all proposed project features, rights-of-way, construction easements, and staging areas. The APE extends to the maximum depth of proposed ground disturbance.

3.4.1 Prehistoric Context

Cultural Chronology

The general cultural chronology of the Sacramento Valley is referred to as the Central California Taxonomic System. Within this, three horizons of distinct human behaviors exhibited through material culture have been identified, although these horizons are by no means uniformly applied across the region. Few very early archaeological sites are known from the Sacramento Valley and the earliest definitive period of human occupation in the region was during the Early Horizon, 4750-2500 years before present (BP). The beginning date of this period has sometimes been undefined by cultural chronologies (EDAW 2003; Moratto 1984). Geo-archaeological investigations in the valley have suggested that an undiscovered population of earlier sites exists subsurface, over time covered by alluvial flooding of the various regional waterways (Meyer 2008; Moratto 1984). However, the archaeology of the Lake Natoma area would suggest that occupation of the region extends into this early period (EDAW 2003).

Most Early Horizon sites known in the Central Valley are from the Sacramento-San Joaquin Rivers Delta. Prehistoric sites of this period are generally characterized by a high frequency of graves and associated grave goods, Olivella shell beads, rectangular abalone (*Haliotis* species) beads and geometric ornaments, charmstones of schist, granite, and alabaster, stone smoking pipes, and heavy stemmed and foliate projectile points. The period also is characterized by a lack of bone and groundstone artifacts and baked clay objects. The typical artifact assemblages of Early Horizon sites have led archaeologists to infer a dependence on hunting with atlatls (a device for throwing a spear or dart) and fishing, with little reliance on gathering acorns and hard seeds. Items made of coastal shells (Olivella and abalone) and other materials obtained elsewhere (quartz, schist, alabaster) indicate a degree of trade between the Sacramento area groups and those along the coast and Sierra foothills, or possibly a seasonal round of settlement (EDAW 2003; Moratto 1984).

Middle Horizon (2500-1450 BP) sites are typified by an increase in instances of cremation, a decrease in numbers and variation of grave goods, Olivella shell beads, circular and subrectangular beads and geometric ornaments made of abalone (primarily black abalone [*H. cracherodii*]), perforated canid teeth and bear claws, baked clay objects, and charmstones in "fishtail" and asymmetrical spindle shapes. Cobble mortars and some evidence of wooden mortars are also typical, as well as extensive bone tool assemblages and large, heavy projectile points with foliate and lanceolate concave bases. The projectile points are usually of materials other than obsidian and have been interpreted as indicators of continued atlatl use. Together with the increase in groundstone artifacts, archaeologists believe the subsistence base became diversified during this time to include fowling and seed processing. There is also extensive evidence in burials of an increase in violence, including projectile points embedded in the skeletal remains. Some distinctive artifacts and radiocarbon dates may indicate the movement of a population or group of peoples into or out of the Sacramento Valley (i.e., "replacement") (EDAW 2003; Moratto 1984).

Late Horizon (1400-100 BP) sites are characterized by artifact assemblages that include an abundance of baked clay items, Olivella shell beads, an elaboration of shapes and increase in density of abalone ornaments, the introduction of magnesite disk beads and cylinders, clamshell disk beads, and bird bone tubes with incised geometric designs. Flanged tubular schist and steatite smoking pipes are also typical. Projectile points in Late Horizon sites are typically small, serrated, and side-notched obsidian points, as well as shaft straighteners. These items suggest an introduction of the bow-and-arrow during this period. Groundstone artifacts typically include shaped flat-bottomed mortars and cylindrical pestles. Such an assemblage is believed to infer a subsistence base focused on acorn and other plant gathering, hunting, fowling, and fishing. Burials and cremations are accompanied with evidence of elaborate ceremonies. Late in the period, as Spanish and Euro-Americans began to enter the area, objects of those cultures began to make their way into the assemblages of Late Horizon archaeological sites (EDAW 2003; Moratto 1984).

3.4.2 Ethnographic Context

The people associated with the eastern Sacramento Valley are the Valley Nisenan, but the project area is also near the historic northern territorial boundary of the Plains Miwok (Wilson and Towne 1978). It is likely that both groups used the project area over time. At the time of historic contact and ethnographic documentation in the region, Valley Nisenan occupied the area.

Valley Nisenan external relations, including trade, warfare, and ceremonial gatherings, were facilitated by waterways like the American River and its tributaries. Occupation sites attributed to Valley Nisenan were typically constructed on low natural rises along streams and rivers or on gentle slopes with southern exposure. In fact, numerous Valley Nisenan villages have been documented along the American River. One village, Yokok, is just upstream of the project area in the Lake Natoma State Recreation Area (EDAW 2003; Wilson and Towne 1978; Figure 1). The population was distributed in tribelets that occupied large village sites and surrounding clusters of smaller settlements. However, only one village held a leading role in the socio-political organization of the cultural group. Outside of main village site complexes, smaller sites were used as seasonal camps, quarries, ceremonial grounds, locations for trade, fishing, cemeteries, river crossings, and battlegrounds. Additionally, numerous trails were established to link such sites and topographic features within the territory (Wilson and Towne 1978).

Hunting, fishing, and gathering formed a year-round resource base for the Valley Nisenan. They traded fish, roots, some grasses, shells, beads, salt, and feathers in return for various hard nuts, berries, skins, bows, obsidian, and other lithic material and subsistence resources unavailable locally. Deer drives were a common method in game hunting, while smaller game and birds were caught using sticks, arrows, traps, snares, nets, fire, and rodent hooks. Similar implements, including weirs, nets, harpoons, traps, and gorge hooks, were used in fishing. Tule balsas and log canoes were typically used in fishing. Other techniques included poisoning the fish using soaproot or turkey mullein or driving the fish into shallow water to be caught by hand. Freshwater shellfish were also collected from the rivers (Wilson and Towne 1978).

Little ethnographic documentation of Valley Nisenan religion exists and in some instances, details vary in the oral stories of the people. However, there are some constants that were recorded, primarily in the realm of ceremonial dances. Other ceremonies included an annual mourning ceremony held in the fall. For the Valley Nisenan, all natural objects were of religious importance and possessed potential supernatural powers. Such items could harm or bring luck to a person (Wilson and Towne 1978).

3.4.3 Historic Context

Mexican Era

The project area is on the historical Mexican land grant of Rio de los Americanos, purchased by William Alexander Leidesdorff, who became a naturalized citizen of Mexico in 1844 from the United States. His land grant originally consisted of 35,000 acres, extending from the point where present-day Bradshaw Road connects with the American River to the eastern end of present-day Folsom (Folsom History Museum 2009; US Surveyor General 1859). Leidesdorff was an educated successful businessman who owned property and other assets in San Francisco. He died in 1848 (Folsom History Museum 2009).

Gold Rush and Mining

The discovery of gold in the foothills of present-day El Dorado County spurred the establishment of mining camps along the rivers that surround the project area, such as the American River. Gold mining began in the region in 1849, initially by small groups of miners using simple equipment (EDAW 2003). By 1850, placer mining in the riverbeds was becoming more difficult, and large-scale mining operations began. Large-scale investment was soon needed for the labor and equipment to construct flumes, canals, and dams to expose gold along the American River. The Virginia Mining Company was the most prominent mining company in the project area (EDAW 2003). Later, in the mid-1850s to the 1870s, access to deeper and more extensive gold deposits were needed. Ground sluicing and high-pressure hydraulics were required to move large quantities of water. The Natoma Water and Mining Company built a series of ditches, which brought water from the American River, to diggings to the south and west (EDAW 2003). Large tunnels were excavated in the banks of the American River, leaving behind large gravel deposits. The 1890s saw the use of draft and ground sluicing operations, as well as hydraulic mining and tunneling.

During the 1890s until the early 1960s, large-scale dredging took place within the project area, and surface mining was in full swing. Many small dredging companies were established during this time, but by 1962, the smaller dredging companies were acquired by Natoma Consolidated of California (EDAW 2003). It is estimated that over one million dollars worth of gold was dredged within this region from 1906 and 1962 (Folsom History Museum 2009). A 1967 USGS Folsom 7.5-minute quad (photo revised 1980) shows that the area around the hatchery and a large swath of land to the west and north contain dredge tailings (USGS 1967).

A Brief History of Central Valley Water Project and the Nimbus Dam and Weir

The project area lies within the CVP, which began construction in the late 1930s. Early plans dated to 1919, when then California Governor William Stephens and Colonel Robert Bradford Marshall, Chief Geographer for the USGS, proposed a plan to construct storage reservoirs along the Sacramento River that would transfer water from the Sacramento River Valley to the San Joaquin Valley via two large canals on both sides of the Sacramento River (Reclamation 2009a). The American River Division of the CVP aims to provide water for irrigation, municipal and industrial use, hydroelectric power, and recreation (Reclamation 2009b).

The USACE constructed the Nimbus Dam in 1955, in conjunction with the Folsom Dam, which, along with the Folsom Power Plant seven miles north of the project area, regulates the flow of the American River to provide water and electrical power for municipal and industrial use. Nimbus Dam and Lake Natoma, which are within the project area, act as an after bay, regulating the outflows from the Folsom Power Plant (Reclamation 2009a).[1]

[1]The Nimbus Dam is not within the APE for this project, but is discussed because construction of the dam created Lake Natoma and, by association, the Hatchery and weir, which are within the APE. As such, the dam has a historical association with the APE.

The contract for the construction of the Nimbus Dam was awarded in June 1952 to a joint venture between the Winston Brothers Construction Company and the Al Johnson Construction Company. Its construction blocked the natural spawning access for salmon and steelhead trout, resulting in Reclamation's construction of the Hatchery and diversion weir. Concrete for the overflow weir began to be placed in 1952, and all work on the dam, the diversion weir, and Hatchery was completed by 1955 (Reclamation 2009a).

3.4.4 Existing Cultural Resources in or near Project Area

Archaeological Resources

No field survey for archaeological resources or records search through the California Historical Resources Information System was conducted for this project. Given that the surface of the APE is either built, paved, underwater, or extensively disturbed, a field survey would likely not have identified any new archaeological sites in the APE. Survey reports and overviews for adjacent Reclamation property indicate that at least two known archaeological sites are next to the APE (EDAW 2003; Dames and Moore 1995).

EDAW's survey of the Lake Natoma State Recreation Area, just north of the project area, identified the location of prehistoric site CA-SAC-180, approximately 200 feet east of the project area, and a portion of historic site CA-SAC-308H, approximately 800 feet southwest of the project area (EDAW 2003).

CA-SAC-180 is described as a prehistoric village site originally recorded in 1952, but the site record indicates that the site was destroyed by the construction of Nimbus Dam (AET 1952). The presence of any remaining archaeological materials in the area is unknown.

CA-SAC-308H is a large, dispersed historic site related to mining and dredging along the American River. Localized areas have been given unique indicators by the North Central Information Center (NCIC). An area immediately south of the Hatchery has been designated LN-8 and is also referred to as the Pennsylvania Flat Diggings. It contains remnant placer mining features, including rock piles up to ten feet tall. Typical evidence of age, such as extensive lichen and moss, is not present, but the amount of vegetation present at the time of recording did appear to correspond to a historic age. At its initial documentation in 1988, the site was described as being in poor condition. During its 2003 field survey for the Lake Natoma State Recreation Area, EDAW re-located the site and noted that it had degraded since 1988 (EDAW 2003). Gold Country Boulevard had been constructed paralleling the American River. Only a small portion of the tailings remains between the road and a bike path. The site record indicates that CA-SAC-308H is ineligible for listing on the CRHR and NRHP, but neither the record nor EDAW's 2003 report provides a detailed argument for this ineligibility.

Ethnographic Resources

Since Native American consultations are still in progress, the presence of Native American sacred sites or other resources significant to the consulted tribes is unknown (see discussion in Section 3.4.5). Often, tribes consider some categories of prehistoric archaeological sites, as well as topographic features or natural resources, to be sacred.

Historic Architecture

The buildings and structures that comprise the Nimbus Fish Hatchery complex that are proposed for alteration have been evaluated by Reclamation's Architectural Historian for the NRHP and were found to be ineligible for inclusion in the NRHP. Reclamation would remove the weir as part of the proposed project independent of any changes in fishing regulations made by CDFG. Therefore, the weir was not evaluated for eligibility under the California Register of Historical Resources, only for eligibility under the NRHP.

3.4.5 Regulatory Framework

NHPA, Section 106. As a federal undertaking, the proposed project is subject to federal regulations, policies, and laws, including Sections 106 of the NHPA, NAGPRA, Archaeological Resources Protection Act (ARPA), AIRFA, and EOs 13007 and 13175. NAGPRA, ARPA, AIRFA, and the two executive orders apply primarily to the protection of archaeological and Native American resources and religious rights. NAGPRA protects Native American graves, including human remains and grave goods. ARPA prohibits unauthorized excavation or removal of archaeological materials from public lands, as well as selling, purchasing, or transferring materials obtained illegally. It also implements a permitting process for archaeological excavations on federal and tribal lands. AIRFA protects and preserves the traditional religious rights of Native Americans. EO 13007 applies to Native American sacred sites and states that federal agencies will "(1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites." EO 13175 requires that federal agencies consult and coordinate with Native American tribal governments.

The NRHP criteria are codified in 36 CFR, Part 60, and are explained in guidelines published by the Keeper of the National Register.[2] The significance of effects on cultural resources is also determined by using the criteria set forth in the regulations implementing Section 106 of the NHPA (16 USC 470 [f]), as amended (PL 89-515), and its implementing regulations (36 CFR, Part 800.9 [a] and [b]), which require federal agencies to consider the effects of their actions on properties listed on or eligible for listing on the NRHP, the criteria for inclusion on which are as follows (36 CFR 60.4):

- Association with events that have made a significant contribution to the broad patterns of our history;
- Association with the lives of persons significant to our past;
- Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic

[2]The most widely accepted guidelines are contained in the US Department of Interior, NPS "Guidelines for Applying the National Register Criteria for Evaluation," *National Register Bulletin 15* (Washington DC: US Government Printing, 1991, revised 1995 through 2002).

values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

- Resources that have yielded or may be likely to yield information important in prehistory or history.

In addition to historic significance, a property must have integrity to be eligible for the NRHP. This is the property's ability to convey its demonstrated historical significance through location, design, setting, materials, workmanship, feeling, and association.

Section 106 describes the procedures for identifying and evaluating eligible properties, assessing the effects of federal actions on eligible properties, and consulting to avoid, reduce, or minimize adverse effects. Eligible properties need not be formally listed on the NRHP but are afforded the same protections as listed properties. Agencies are required to consult with the SHPO under Section 106, which does not require the preservation of historic properties; instead, it ensures that the decisions of federal agencies concerning the treatment of these places result from meaningful considerations of cultural and historic values and of the options available to protect the properties. The proposed action and alternatives are undertakings as defined by 36 CFR, Part 800.3, and are subject to Section 106 and consideration under other federal requirements.

CEQA. The criteria for identifying historical resources under CEQA are in Section 15064.5(a)(2)-(3) of the CEQA Guidelines, which provide the criteria from Section 20524.1 of the California Public Resources Code. The California Register of Historical Resources (CRHR) is in the California Code of Regulations Title 14, Chapter 11.5. According to this code, properties listed on or formally determined eligible for listing on the NRHP are automatically eligible for listing on the CRHR, the criteria for which are largely based on the NRHP criteria, above. To be considered eligible for listing on the CRHR, a property must have both significance and integrity. Loss of integrity, if sufficiently great, will overwhelm a property's historical significance and render it ineligible. Likewise, a property can have complete integrity, but if it lacks significance, it is considered ineligible.

Historic significance of each resource must be determined to be significant at the local, state, or national level under one of four criteria (paraphrased below) in order to be determined eligible for listing on the CRHR:

- Resources associated with important events that have made a significant contribution to the broad patterns of our history;

- Resources associated with the lives of persons important to our past;

- Resources that embody the distinctive characteristics of a type, period, or method of construction, or represents the work of a master; and

- Resources that have yielded, or may be likely to yield, information important in prehistory or history.[3]

3.4.6 Status of Section 106 Consultations

SHPO

Reclamation consulted with SHPO on their determination of eligibility; the SHPO concurred with the determination on September 7, 2010 and on the finding of no historic properties affected pursuant to the regulations at 36 CFR 800.4(d)(1). (See Appendix E.)

Native American

Reclamation initiated consultation with Native Americans on February 16, 2010, as part of the Section 106 process for the proposed project. Letters requesting input and comment were sent to the Buena Vista Rancheria, Ione Band of Miwok Indians, Shingle Springs Band of Miwok Indians (Shingle Springs Rancheria), and the United Auburn Indian Community of the Auburn Rancheria (UAIC). At the time of this document's publication, Reclamation had received responses from the UAIC and the Shingle Springs Rancheria.

The UAIC responded by letter on March 10, 2010, that although they do have concerns regarding development with their ancestral territory that has potential to impact sites and landscapes that may be of cultural or religious significance, they had no comment regarding the proposed project. They requested that they be contacted to provide input on the appropriate course of action in the event of an inadvertent discovery of prehistoric cultural resources or human burials during construction.

The Shingle Springs Rancheria, in coordination with an assigned Most Likely Descendant, Mr. John Tayaba, responded by letter on April 6, 2010, with a formal request to enter into consultations under Section 106 of the NHPA. The elevated archaeological potential of the project area and vicinity was noted. Reclamation contacted the representatives to coordinate a site visit and consultation meeting at the Hatchery. At the time of this document's publication, the meeting was yet to occur.

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[3]California Public Resources Code, Sections 4850 through 4858; California Office of Historic Preservation, "Instructions for Nominating Historical Resources to the California Register of Historical Resources," August 1997.

3.5 Geology and Soils

The Nimbus Dam is in an area where the American River valley narrows. The north bank of the river is formed by a steep cliff, and the south bank of the river consists of low widespread terrace gravels at several levels, which indicate historical erosion and deposition by a river moving within its floodplain. Regionally, the entire valley in this area is underlain by the Mehrten Formation, an approximately 200-foot-thick sequence of fluvial sediments, which are the result of volcanic activity and erosion in the upstream Sierra Nevada. The Mehrten Formation is from the Upper Miocene, approximately 11.6 to 5.3 million years ago. The Mehrten Formation consists of andesitic soft sandstone, siltstone, and cobble conglomerate and is topped by a white to pale buff pumiceous tuff. These sediments are lensed and channeled throughout the formation. The different beds within the Mehrten Formation were deposited as channel fill, and therefore they dissect each other and are rarely continuous. The soft sandstones, siltstones, and cobble conglomerate of the Mehrten Formation are relatively pervious, however its other lithologies, including mudflows and clays, are relatively impermeable (Reclamation 1960). Locally, the Mehrten Formation is overlain by a variety of later alluvial sediments, including the Pliocene Laguna Formation, the Pleistocene Modesto Formation, and Holocene channel deposits and dredge and placer tailings (Wagner et al. 1981). In the vicinity of the Hatchery, the surface geology is either Modesto Formation or channel deposits and dredge/placer tailings. The Laguna Formation is exposed on the north bank of the river along the steep cliff.

The uppermost layers are fluvial deposits, ranging in texture from cobble and gravel to silt and clay. The uppermost deposits were dredged for gold through the early 1960s, typically from 35 to 65 feet below the ground surface, with deeper dredging at a few locations. The dredge rows that remain have large cobbles on the surface, with a generally well-graded assortment of silt- through gravel-sized material underneath (Aerojet General Corporation 2008).

The soils along the embankment of the river are a mixture of Urban land-Natoma complex and Xerothents, soil that formed in dredge tailings (Reclamation 2008a). The Urban-land Natoma complex occurs on low stream terraces along the American River and other low terraces next to the river and consists of loam, clay loam, and sandy loam. The Xerothents have a high content of gravel and cobbles and were deposited as tailings during mining. Recreational use of Nimbus Shoals contributes to erosion of soil on the shoals. Impacts are primarily the result of vehicle use as standard vehicles are able to drive all over the shoals and off-road vehicles drive over the embankment.

The nearest fault zone to the project area is the Bear Mountain fault, which crosses the north, south, and middle forks of the American River, upstream of Folsom Lake.

Paleontological Resources

Within the region, the Laguna Formation has been identified as a geological feature potentially containing Pliocene age land vertebrate fossils. Some mammal fossils have been recovered from the Laguna Formation in other areas along the western edge of the

Sierra foothills. Similar fossils could be found on the north side of Lake Natoma, near the APE, at the outcrops of the Laguna Formation. The Society of Vertebrate Paleontology has determined that such fossils are significant and important. California law protects significant fossils when found on state land (GCI 2003).

3.6 Water Resources

3.6.1 Introduction

The Hatchery and weir are on the American River, approximately a quarter-mile downstream of Nimbus Dam. The Hatchery, Lake Natoma, which is impounded behind Nimbus Dam, and the dam itself are part of Reclamation's Folsom Unit, American River Division, of the Central Valley Project (CVP). Nimbus Dam is seven miles downstream of Folsom Dam and was constructed to regulate the water releases for power generated through the Folsom power plant. Nimbus Dam is a concrete gravity dam 1,093 feet long and 87 feet high, and the dam and power plant were completed in 1955. Lake Natoma has a capacity of 8,760 acre-feet and a surface area of 540 acres (Reclamation 2009c). Both Nimbus Dam and Lake Natoma are part of the American River Division of the CVP.

The American River travels approximately 23 river miles, from Nimbus Dam to the river's terminus at the Sacramento River. This portion of the American River is known as the lower American River, which is fed by releases from Nimbus Dam. The NPS designated this reach a Wild and Scenic River in 1981. The Secretary of the Interior further designated this section of the American River as a Recreational River, under the National Wild and Scenic Rivers Act, and the river is given the same designation by the State of California under the State Wild and Scenic Rivers system.

The California Interagency Watershed Mapping Committee (CIWMC) has developed a system for naming and delineating watersheds and subunits in California, beginning with 10 hydrologic regions, each of which covers millions of acres. These units are progressively subdivided into five smaller nested levels, as follows: hydrologic units, hydrologic areas, hydrologic subareas, super planning watersheds, and planning watersheds. The section of the American River including Nimbus Dam and Lake Natoma is contained within the Valley-American hydrologic unit, which includes both the Coon-American and Morrison Creek hydrologic areas. The Valley-American hydrologic unit covers 493,000 acres (CIWMC 1999).

3.6.2 Surface Water Resources

Reclamation operates Nimbus Dam to help regulate releases of water from the upstream Folsom Dam and in the process provides flood control; generates hydroelectric power; and supplies water for irrigation, municipal, and industrial uses, recreation, and protection of aquatic resources (Water Forum 2007). Flow in the lower American River varies throughout the year and is primarily controlled by Folsom Dam flood control releases or downstream water demands. These include downstream Sacramento-San Joaquin Delta Water Quality Control Plan requirements, CVP water supply objectives, and other downstream non-CVP water demands. To a lesser extent, flow in the American River is also controlled by power regulation and management needs. SWRCB Decision 893 states that in the interest of fish conservation, releases from Nimbus Dam should not fall below 250 cfs between January 1 and September 15 and should not fall below 500 cfs during other times. However, these minimum flows are rarely the controlling factor for flows in the lower American River (Reclamation 2004).

The river gaging station closest to the project area is approximately half a mile downstream of the dam. Data from this gaging station indicates that flow conditions for 1976 through 2008 generally range between 1,000 cfs and 7,500 cfs. Data from the Natoma Lake gaging station at Nimbus Dam has been collected continuously since the mid-1990s for three points along the dam, the tailrace for the turbine penstock (power generation), the outflow for reservoir releases (regular flows), and the spillway (flood control). These data indicate that for the past 10 years (1999 through 2009) releases from Nimbus Dam were generally in the 1,000 to 8,000 cfs range. However, during the winter of 2006, maximum releases from the dam were approximately 35,063 cfs (DWR 2009).

Upstream of the weir, flows are highest along the north bank of the river. Downstream of the weir, the higher flows swing over toward the south bank. The orientation of the weir contributes to this shift.

The backwater created by the diversion weir has relatively low velocity upstream to the Hazel Avenue Bridge. Velocities then increase up to the stilling basin, where they begin to decrease.

Flow in the river is lowered to 1,000 cfs during the weir superstructure installation; the foundation of the weir and its piers are permanent, remaining in the river year-round. Installation of the complete weir occurs in mid-September, when Reclamation and Hatchery personnel enter the river to install the support frame, racks, and pickets on the concrete piers. The installation may take up to five days to complete.

The 100-year flow in the American River that is recognized by the Federal Emergency Management Agency is 180,000 cfs, based on hydrologic analysis following a large flood in 1986. However, because of modifications in the operations of Folsom Lake and upstream reservoirs that resulted from an agreement between the Sacramento Area Flood Control Agency and Reclamation, the 100-year flow in the American River is 145,000 cfs (County of Sacramento DERA 2006b). Up to the highest flood control releases (130,000 cfs), the river is contained in its banks upstream of Sailor Bar, downstream of the project area. The diversion weir foundation has little effect on water surface elevations at these high flows.

In addition to the American River, the project area includes several small wetland areas on the south shore of the American River and in the Nimbus Shoals area. The wetland area on the south shore extends almost the entire length of the Nimbus Shoals shoreline, from Nimbus Dam to the Hazel Avenue Bridge. Additional information regarding the wetlands in the project area is provided in Section 3.2, Biological Resources.

3.6.3 Surface Water Quality

The American River system supports a number of beneficial uses along its three main forks and many tributaries and is generally considered an excellent source of high-quality water. Water from the American River watershed is suitable for all beneficial uses, including municipal supply, contact and noncontact recreation, agricultural and industrial supply, warm-water and cold-water fish habitat (including anadromous fish migration and spawning habitat), and wildlife habitat. Waters from the upper watershed generally have excellent quality with regard to mineral and nutrient content and low concentrations of total dissolved solids.

Under Section 303(d) of the Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. Impaired waters are defined as "waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes." The law further requires that these jurisdictions establish priority rankings for waters on the lists and develop a total maximum daily load (TMDL) for these waters. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards (EPA 2009a). For the lower American River region, the CVRWQCB is responsible for maintaining the Section 303(d) impaired waters list.

The most recent adopted 303(d) impaired waters list is from 2006. This list identifies the lower American River as being impaired by mercury due to abandoned mine sources and being impaired by unknown toxicity from an unknown source. As part of the Aerojet Superfund site project, Aerojet samples the surface water monthly in the lower American River to test for volatile organic compounds, which have never been detected in these samples (MacDonald 2009).

The Hatchery is one of the few permitted discharges on the lower American River. As part of the process of renewing its National Pollutant Discharge Elimination System permit (CA0004774) in 2005, Reclamation conducted a two-year study to determine if Hatchery discharges were incrementally contributing to the mercury levels in the river. The study concluded that Hatchery discharges do not contribute to mercury levels in the river (Robinson 2010).

Recreational use of Nimbus Shoals contributes to water quality degradation of surface waters. Anglers have deposited lead sinkers on the apron of the power plant outfall and in the river; contamination to downstream waters is minimal due to large size of the sinkers, which limits their mobility. Erosion from vehicles on the shoals likely results in siltation in surface waters. Additionally, vehicles park near the river's edge, increasing the potential for fluids leaked from vehicles to degrade surface water quality.

3.6.4 Groundwater Resources

The project area is within the Sacramento Valley groundwater basin and straddles two groundwater subbasins, the North American and South American groundwater subbasins. Together, these two subbasins cover 599,000 acres, including 351,000 acres in the North American subbasin and 248,000 acres in the South American subbasin (DWR 2003).

The Aerojet Superfund site has contaminated groundwater over several square miles, including the project area. The site is near the contact between the Sierra Nevada metamorphic basement rocks and the Great Valley Sedimentary Sequence and is characterized by shallow-dipping Cretaceous-, Tertiary-, and Quaternary-age marine and fluvial sediments. The sedimentary sequence includes undifferentiated Tertiary and Quaternary sediments, including the Laguna, Mehrten, and Valley Springs Formations.

Based on lithologic, hydrographic, geophysical, and chemical data, sediments beneath the Aerojet site were divided into separate aquifers, Layers A through F. Layer A is the shallowest and is defined as the first encountered groundwater, although it is not present or unsaturated in many areas of the Aerojet site. Layer B is relatively thin and is also absent or unsaturated in many areas. Layers C through F are in the deeper geologic formations, and Layer F is the deepest zone. Layer A is absent in the vicinity of the American River, and Layer B is unsaturated or absent in most of this area. Where it exists, Layer B ranges from approximately 1 to 20 feet thick, while Layers C and D range from approximately 40 to 90 feet thick. In the vicinity of the American River, groundwater flows west and northwest, and the hydraulic gradient is relatively flat. Depth to groundwater increases from east to west, and groundwater in the vicinity of the Hatchery is approximately 50 feet below ground surface (Aerojet 2009a).

3.6.5 Groundwater Quality

Overall groundwater quality in the North and South American subbasins is good, with average total dissolved solids in the South American basin of 221 milligrams/liter (mg/l) and in the North American basin of 300 mg/l. However, contaminants, including trichloroetheylene (TCE), perchlorate, and n-nitrosodimethylamine, have been detected in groundwater locally in the vicinity of the Aerojet site, including the area of the Hatchery and north of the American River. During the July through September 2008 sampling period, TCE concentrations in Layer C groundwater in the vicinity of the Hatchery were on the order of 500 micrograms per liter (μg/L), while concentrations in Layer D were on the order of 40 μg/L, and TCE was not detected above laboratory reporting limits (5 μg/L) in Layer E groundwater (Aerojet 2009b). The EPA's maximum contaminant level for TCE in drinking water is 5 μg/L (EPA 2009b), although Layers C and D may not be considered part of the drinking water aquifer because of their shallow depth.

3.7 Hazardous Materials and Waste

Hazardous materials and waste include the use, storage, transport, and disposal of hazardous materials and waste, the management of hazardous materials and waste, and the cleanup of contaminated sites. The region of influence for hazardous materials and waste is the project area and surrounding areas where contamination or hazardous materials management could affect the project area.

Hazardous materials and waste within the project area include oil, fuel, and other hazardous substances, such as antifreeze, which may leak from vehicles accessing Nimbus Shoals. Driving and parking is not restricted in the Nimbus Shoals area and vehicles may park and drive to the edge of the lower American River, where vehicle fluids may enter the soil and water.

Solid waste, primarily trash left by recreationists of the American River Parkway within the project area, collects on Nimbus Shoals and on the weir. Hatchery personnel remove trash and dead fish from the weir daily while the superstructure is in place. Although there is a portable restroom at Nimbus Shoals, visitors do not always make use of it.

Anglers in the project area have deposited a significant volume of lead sinkers on the apron of the Nimbus Dam power plant outfall and in the lower American River.

The segment of the lower American River that includes the project area was listed as an impaired water body, as defined in Section 303(d) of the Clean Water Act in 2006. Two pollutants were listed: mercury from abandoned mines and “unknown toxicity” from an unknown source (State Water Resources Control Board 2006).

The Hatchery stores and uses various hazardous materials. The County of Sacramento inspects it annually for hazardous materials compliance (Hoover 2009a). A 2004 map of the Hatchery depicts a hazardous materials shed north of the egg hatchery building and a flammable liquids shed east of the covered troughs (Versar, Inc. 2004). More information about the hazardous materials typically used and stored at the Hatchery is provided in Table 3-4.

A 2,000-gallon underground storage tank (UST) containing diesel fuel was formerly located at the Hatchery. The UST and associated piping and fuel dispensers were removed and disposed of off-site in 1997, along with approximately 60 tons of contaminated soil. Additional soil sampling was conducted in 2004. Although an estimated 57 pounds of residual total petroleum hydrocarbons as diesel (TPH-d) remained in soil, groundwater was not impacted, and natural attenuation was determined to be protective of human health and safety at the site. The CVRWQCB and the Sacramento County Environmental Management Department Local Oversight Program granted the site low-risk closure in March 2005 (County of Sacramento, Environmental Management Department 2005).

Table 3-4. Hazardous Materials at Nimbus Fish Hatchery

Material	Approximate Quantity On-Site	Use
Hydrogen peroxide	7 55-gallon drums	Therapeutic, for fish disease
Potassium permanganate	6 100-pound containers	Therapeutic, for fish disease
Sodium chloride	800 50-pound bags	Prevention of fish disease
Hydraulic oil	1 55-gallon drum	Equipment
Acetylene gas	1 136-cubic-foot cylinder	Welding
Waste oil	1 container	Equipment
Oxygen gas	6 280-cubic-foot cylinders	Fish transportation
Mixed gas (90% helium, 7.5% argon, 2.5% carbon dioxide)	1 280-cubic-foot cylinder	Welding
Mixed gas (75% argon, 25% carbon dioxide)	1 280-cubic-foot cylinder	Welding
Argon gas	1 280-cubic-foot cylinder	Welding
Gasoline	5 5-gallon containers	Equipment
Sodium bicarbonate	6 50-pound bags	Anaesthetizing fish
Citric acid	6 50-pound bags	Cleaning troughs

Source: Hoover 2009a

Aerojet General Corporation occupies an 8,500-acre site southeast of US Highway 50 near the project area. Aerojet was placed on the National Priorities List (NPL) in 1983. The NPL, also known as Superfund, is a list of approximately 1,200 contaminated sites in the US and its territories with high priority for cleanup. Historical activities and waste disposal methods at Aerojet contaminated approximately ten square miles of groundwater, including the project area. Contamination has also affected the lower American River in the project area (EPA 2006, 2009c).

The contaminated area has been divided into multiple operable units (OUs) and zones to facilitate site investigation and cleanup. The project area is in Zone 1 of OU-5, the Perimeter Groundwater OU. The primary contaminants of concern in OU-5 are the volatile organic compound (VOC) trichloroethylene, the salt perchlorate, and the semi-VOC n-nitrosodimethylamine. Trichloroethylene was detected in concentrations ranging from 240 to 8,500 parts per billion in groundwater extracted from two CDFG wells at the Hatchery as early as 1979 (California Department of Health Services 1989). Human health and ecological risks were assessed to estimate potential risks from these contaminants. The ecological risk assessment determined that there are no ecological risks within OU-5 that require action. The human health risk assessment determined that groundwater exceeds drinking water standards and the acceptable human health risk for all three contaminants of concern in Zone 1 of OU-5; therefore, remedial action is required (EPA 2006, 2009c).

The EPA released a proposed plan to address contamination within OU-5 in August 2009, which addressed three alternatives: no action, groundwater containment, and the EPA's preferred alternative, groundwater containment and mass removal (i.e., cleanup). The no action alternative was not viable since it did not meet the EPA's threshold criteria for an acceptable alternative. The public comment period on the proposed plan ended in September 2009. After reviewing public comments, the EPA will finalize a ROD that documents the alternative selected for implementation. Either alternative will require extracting (pumping) and treating millions of gallons of groundwater in OU-5 over several decades to achieve cleanup goals (EPA 2009c).

The Hazel Avenue Ponds, also known as the Libby Ponds, occupy an area approximately bounded by the lower American River on the north, Hazel Avenue on the east, and US Highway 50 on the south. From approximately 1917 until 1976, up to nine ponds received waste from the Libby, McNeil, and Libby olive processing plant southeast of the intersection of Hazel Avenue and US Highway 50. Chemicals known to have been released to the ponds are salt, sodium hydroxide, sulfur dioxide, lime, ferrous gluconate, lactic acid, and acetic acid. The ponds are a series of gullies between ridges of mine tailings. Much of the site has been leveled and the mine tailings removed. The EPA sampled the site soil in 1983, and, after reviewing the data, the California Department of Health Services determined that the contaminant levels did not pose a human health risk and that no further action was necessary. The Hazel Avenue Ponds were delisted from the State Cleanup Response database in 1989 (California Department of Health Services 1989).

There is no evidence that other sites in the project vicinity have contaminated or have a likelihood of contaminating the project area, based on a review of the SWRCB's GeoTracker Web site and the California Department of Toxic Substances Control's (DTSC) EnviroStor Web site (State Water Resources Control Board 2009; DTSC 2009).

3.8 Public Health and Safety

Public health and safety includes all aspects of the health and safety of users of the project area, including workers and recreationists, as well as physical, chemical, and biological hazards to these users. The region of influence for public health and safety is generally the project area. The surrounding areas are included in the ROI to the extent that health and safety hazards within the project area could affect the surrounding areas.

3.8.1 Physical Hazards

As discussed in Section 2, the weir presents safety hazards to Hatchery personnel. Although safety measures are in place, there is some inherent risk from working on the weir and in the river. Workers use heavy equipment and work in the river to install and remove the weir superstructure seasonally and when flood flows are expected. River flows must be lowered to approximately 1,000 to 1,500 cfs for safety when personnel are working in the water. When the superstructure is in place, workers access the weir via a 3.5-foot-wide platform to clean and maintain the weir. Workers access the weir daily while the superstructure is in place and dislodge dead fish and debris using a hook. Workers may fall in the river or be injured by slips, trips, and falls while on the platform or in the river. Workers often work in rain or other inclement weather, which increases stress and the potential for accidents. Workers follow a set of written safety procedures when performing work on the weir, including a prework safety briefing, the use of personal protective equipment, such as hard hats and personal flotation devices, a reminder about communication between workers performing various tasks, and a reminder that no person should work alone in the river (Burks 2009).

As discussed in Section 2, the weir is also a boating hazard. Although boating is not allowed by county ordinance between the weir and Nimbus Dam, some boats are launched in this area and may become entrained on the weir or dashed against the piers. Persons who slip and fall into the river can also become entrained on the weir, and some have drowned.

Although the public is not allowed to access the weir, anglers sometimes gain access and try to raise the pickets to allow fish to pass upstream.

There is a risk of flooding at Nimbus Shoals. From time to time, the amount of water released from Nimbus Dam is sufficient to inundate the low-lying Nimbus Shoals area. Although a warning siren is sounded before such releases, recreationists at Nimbus Shoals do not always vacate the area. Vehicles could be damaged or destroyed and visitors could be injured or killed if they do not promptly vacate Nimbus Shoals when the warning siren sounds. Flood control agencies have the authority to prevent or respond to flood emergencies in or next to the American River Parkway.

There is a potential for wildland fires in the project area. Wildland fires have occurred along the American River Parkway, particularly during the hot dry summers that are common in California's Central Valley (City of Rancho Cordova 2006a). Vegetated areas that could be affected by wildland fires exist at Nimbus Shoals and on the north bank of the lower American River, which has more consistent vegetation than the Nimbus Shoals area. Nimbus Shoals is next to the Aquatic Center and Hazel Avenue, and the north bank of the lower American River is next to residential development.

Vandalism and vehicle break-ins are common in the project area.

3.8.2 Chemical and Biological Hazards

The California Office of Environmental Health Hazard Assessment (OEHHA) has issued sport fish consumption advisories for many water bodies in California. The advisories are based on contaminant levels in fish and are meant to provide guidelines to help anglers and others who consume fish from California water bodies do so without significant health risks. In the lower American River, historical mining practices have released mercury and other contaminants into the water (OEHHA 2004). Contaminants build up in a fish's fatty tissue to concentrations significantly higher than those in the surrounding water. Table 3-5 presents the OEHHA's sport fish consumption advisory for the lower American River.

Table 3-5. Sport Fish Consumption Advisory for the Lower American River

Fish Species	Servings* per Week	
	Women Ages 18-44 and Children 1-17 Years	Women Over 45 Years and Men Over 17 Years
Black bass	0	1
Pikeminnow	0	1
Sucker	1	2
White catfish	1	2
Redear or other sunfish	1	2
American shad	4	7
Salmon	2-3	7

Source: OEHHA 2009

*A serving is approximately equal to the size of the back of your hand. A serving for a child is smaller than an equivalent serving for an adult.

The Aerojet Superfund site is in the project vicinity and is described in Section 3.7. Groundwater beneath the project site has been contaminated and is not suitable for drinking. Groundwater in the affected area will require extraction (pumping) and treatment over several decades to achieve cleanup goals (EPA 2009c).

3.9 Infrastructure

3.9.1 Utilities and Public Services

Utilities refer to infrastructure and the organizations that oversee them that are designed to provide basic services to citizens and manage waste removal. Common utilities are potable water, wastewater, stormwater, solid waste, electricity, natural gas, telephone, and television. Public services generally are those provided to citizens by the government or government-backed private entities. Common public services are police, fire, medical, schools, and parks and recreation areas. The region of influence for utilities and public services is the service area of each provider. For example, the region of influence for wastewater includes the treatment and disposal facilities where wastewater from the project area would be disposed of. The project area is in an unincorporated portion of Sacramento County, east of Rancho Cordova, and is served by providers for that area.

Water and Wastewater

Golden State Water Company (GSWC) is the potable water provider in the project area (County of Sacramento, Water Agency 2008). GSWC is a public utility and a wholly owned subsidiary of American States Water Company (GSWC 2009). GSWC provides drinking water for the Hatchery, and there are no other drinking water sources in the project area. There is a drinking water main under Hazel Avenue (County of Sacramento, DERA 2006b).

Water for Hatchery operations, such as the fish ladder and rearing ponds, is drawn from Lake Natoma, upstream of Nimbus Dam, and is gravity fed to the Hatchery via a 60-inch–diameter pipe. There is also a 42-inch-diameter water pipe, with roughly the same alignment as the 60-inch pipe, that is currently not in use (Robinson 2009a). Up to 90 million gallons of water per day flow through the Hatchery. Wastewater from Hatchery operations is routed through settling ponds on the property and ultimately is discharged to the lower American River via four outfalls (Hoover 2009b; CVRWQCB 2009).

The Hatchery has a septic tank that receives domestic wastewater, from such sources as restrooms (Hoover 2009a). Sacramento Area Sewer District, a division of the Sacramento Regional County Sanitation District formerly known as County Sanitation District 1, provides wastewater collection, conveyance, and treatment in the surrounding area (City of Rancho Cordova 2006a). An 18-inch force main sewer line under Hazel Avenue runs north from Gold Country Boulevard to Madison Avenue (County of Sacramento, DERA 2006b).

Stormwater

There is no stormwater infrastructure in the project area. Stormwater follows surface topography and either percolates into the ground or runs into the lower American River.

Solid Waste

Debris in the project area is primarily household trash discarded as litter by recreationists. Debris collects in the Nimbus Shoals area and on the weir when the superstructure is in place. The CDPR removes debris from Nimbus Shoals periodically. Hatchery personnel remove debris, including trash and dead fish, from the weir during routine cleaning operations.

The Kiefer Landfill and North Area Recovery Station are the nearest landfills to the project area. Both are owned and operated by the County of Sacramento. Kiefer Landfill is at 12701 Kiefer Boulevard in Sloughhouse, approximately 18 miles northwest of the project area; the North Area Recovery Station is at 4450 Roseville Road in North Highlands, approximately 10 miles west of the project area. Both landfills accept a variety of waste from the public, businesses, and private waste haulers. Kiefer Landfill also accepts a variety of construction and demolition debris, including rocks, gravel, concrete, and asphalt (County of Sacramento, Waste Management/Recycling 2009a, 2009b).

Electricity

The Sacramento Municipal Utility District (SMUD) transmits and distributes electric power to a 900-square-mile service area that includes Sacramento County and a small portion of Placer County. SMUD facilities on Hazel Avenue include an overhead 69-kilovolt (kV) subtransmission line and an overhead 12-kV distribution line. As part of the Hazel Avenue Widening Project, the 12-kV line will be relocated underground; the 69-kV line will remain overhead, crossing the lower American River just east of the Hazel Avenue Bridge (County of Sacramento, DERA 2006b).

Nimbus Dam, the upstream boundary of the project area, contains a hydroelectric plant with an installed capacity of 13,500 kilowatts and a maximum operational capacity of 12,000 kilowatts. It operates as a base load plant, meaning the electricity it produces is used to fulfill a portion of the region’s continuous energy demands. The electricity created by the Nimbus power plant is provided to customers of the Western Area Power Administration (WAPA), Sierra Nevada Region (Reclamation 2009d).

Natural Gas

Pacific Gas and Electric Company (PG&E) supplies natural gas in the project vicinity. PG&E is one of the largest combination natural gas and electric utilities in the United States. A PG&E gas main is under the northbound lanes of Hazel Avenue (City of Rancho Cordova 2006a; County of Sacramento, DERA 2006b).

Telephone and Television

AT&T (formerly Pacific Bell; telephone) and Comcast (television) are the major service providers in the project vicinity, where both companies have pole-mounted and underground lines. AT&T has both wire and fiber optic communications facilities along Hazel Avenue, from Gold County Boulevard north to Madison Avenue. All aerial telephone and television lines will be relocated underground as part of the Hazel Avenue Widening Project (County of Sacramento, DERA 2006b).

Fire and Medical Services

The Sacramento Metropolitan Fire District (Metro Fire) provides firefighting and emergency services, including medical services and search and rescue to a 417-square-mile area that includes the project area. Metro Fire also educates the public about fire safety and trains professional firefighters. The nearest fire station to the project area is Station 63, approximately 0.5 mile south, at 12395 Folsom Boulevard in Rancho Cordova (Metro Fire 2009). Metro Fire responds to wildland fires that may occur in its jurisdiction. (Refer to Section 3.8, Public Health and Safety for more information on wildland fires.)

Within its jurisdiction, Metro Fire provides emergency medical services, including ambulance transport and first responder services. Nimbus Dam is the eastern boundary of Metro Fire's jurisdiction. Folsom Fire Department has jurisdiction over lands east and provides services similar to Metro Fire in this area (Metro Fire 2009; Folsom Fire Department 2009).

The nearest hospitals to the project area are Kindred Hospital at 223 Fargo Way in Folsom and Mercy Hospital at 1650 Creekside Drive in Folsom.

Police Protection, Security, and Law Enforcement

The Sacramento County Sheriff's Department (SCSD) provides police services to unincorporated portions of Sacramento County, including the project area. SCSD also provides police services to several cities through contract, including Rancho Cordova, in the form of the Rancho Cordova Police Department. The nearest SCSD facility to the project area is the Fair Oaks/Orangevale Service Center, at 8525 Madison Avenue, Suite 126, in Fair Oaks. The nearest station is the Rancho Cordova Police Department's Rockingham Station, at 10361 Rockingham Drive in Sacramento (City of Rancho Cordova 2006b; SCSD 2009).

The California Highway Patrol (CHP) patrols all interstate and state highways within California, including US Highway 50. The CHP also provides patrols and assistance on other major roadways in unincorporated portions of the southern Sacramento Valley (City of Rancho Cordova 2006b).

Security and law enforcement within the American River Parkway requires interagency coordination due to overlapping jurisdictions. The Sacramento County Park Ranger Unit is responsible for day-to-day patrol and law enforcement within the American River Parkway, from Hazel Avenue downstream to the confluence of the American and Sacramento Rivers. The Lake Natoma Recreation Area is under CDPR's jurisdiction, and day-to-day patrol services are provided by CDPR's Rangers. The SCSD's jurisdiction includes all unincorporated areas in Sacramento County and thus overlaps the American River Parkway and has concurrent law enforcement responsibilities in this area. The CDFG provides resource protection in the project area, primarily enforcing fishing and pollution regulations. Other agencies that provide law enforcement in this area include the CHP, the Cal Expo Police, and the CSUS Police Department. Volunteer stewardship groups also provide citizen patrols, in cooperation with parkway management (Phillips

2009b; County of Sacramento, Planning and Community Development Department 2008).

Schools, Parks, and Recreation Areas

The project area is on the dividing line between the Folsom/Cordova Unified School District (east of Hazel Avenue) and the San Juan Unified School District (west of Hazel Avenue). There are no schools associated with either school district within one mile of the project area. The nearest school serving children under the age of 18 is LaBella Learning Center, for children ages 2 to 12, approximately one mile north, at 8896 Winding Way in Fair Oaks.

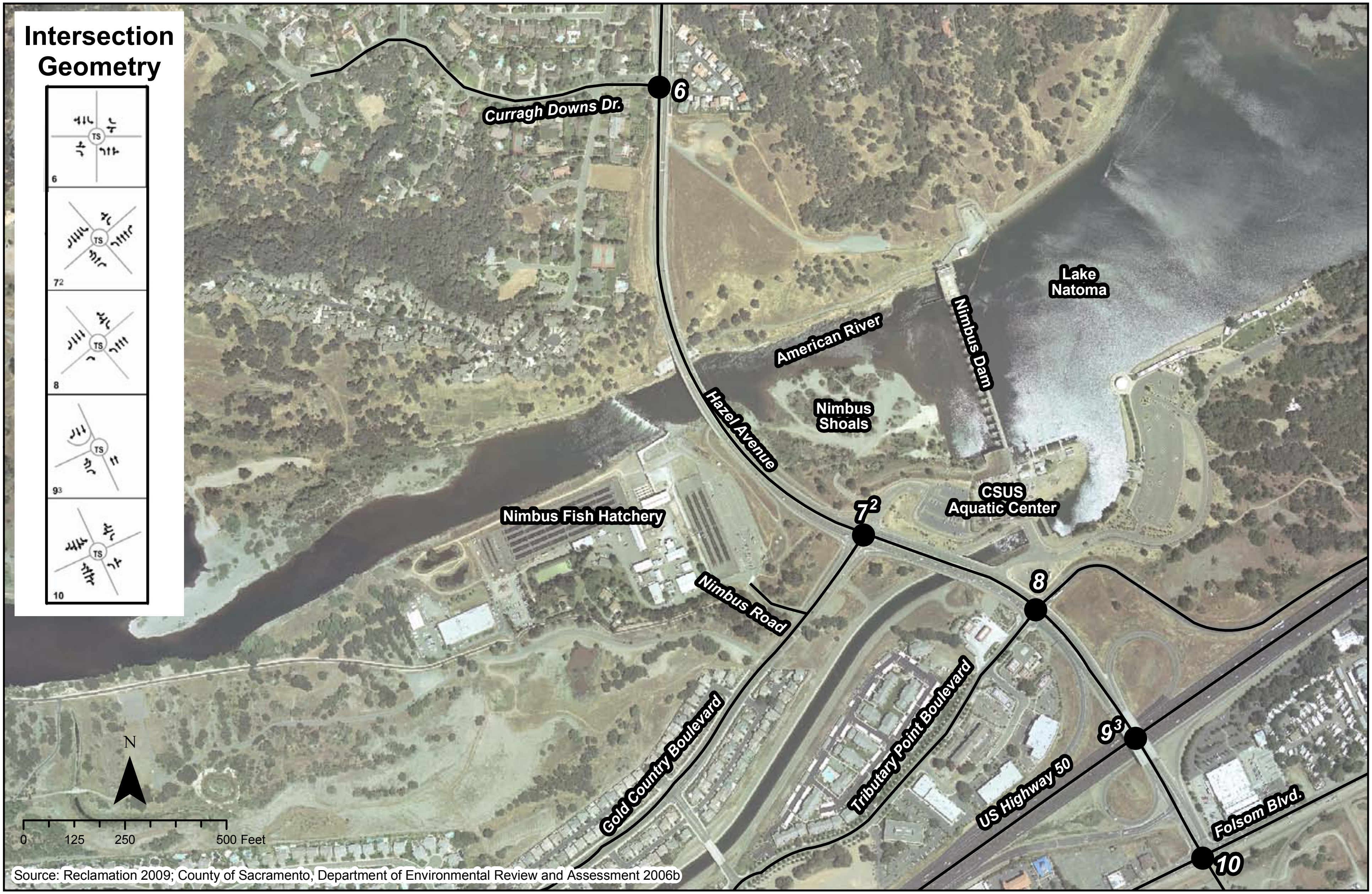
The CSUS Aquatic Center is next to the project area and provides educational, recreational, and competitive boating opportunities and related classes and programming to students and the general public. The California Department of Boating and Waterways and the CDPR also participate in the operation of the facility and its programs (Aquatic Center 2009). For safety, all sanctioned boating activities occur upstream of Nimbus Dam.

3.9.2 Transportation and Traffic

Transportation and traffic refer to the movement of vehicles, bicycles, pedestrians, and equestrians along roads, bridges, and pathways at or near the project area. The region of influence for transportation encompasses the roads and paths that are used for everyday access to the project area and which would be affected by the proposed project.

The project area is approximately 0.4 mile north of the intersection of US Highway 50 and Hazel Avenue. US Highway 50 is a controlled access freeway that runs east-west. Hazel Avenue runs north-south and crosses the lower American River at the Hazel Avenue Bridge. The west side of the Hazel Avenue Bridge contains a pedestrian, bicycle, and equine pathway that connects to the American River Parkway Jedediah Smith Memorial Trail (Parkway Trail). Figure 3-6 depicts the roadways and multi-use pathway in the project area.

Primary access to the project area is via Gold Country Boulevard, which runs northeast-southwest. The intersection of Gold Country Boulevard and Hazel Avenue is a signalized intersection that permits both left and right turns from all sides of the intersection. The Hatchery parking lot and weir are accessed by turning southwest from Hazel Avenue onto Gold Country Boulevard and then turning north onto Nimbus Drive, which ends at the Hatchery parking lot. The Nimbus Shoals are accessed by turning northeast from Hazel Avenue and then turning north onto a paved access road that slopes downhill to the Nimbus Shoals. Continuing northeast, Gold Country Boulevard ends at the CSUS Aquatic Center parking lot. Recent traffic volumes along Gold Country Boulevard and Hazel Avenue are presented in Table 3-6 below.



Note:
2: Eastbound right = free
3: Southbound right = free; Northbound thru = free

Legend

- Intersections
- Roads
- *TS* Traffic Signal

Roads and Intersections

Nimbus Hatchery Fish Passage Project

Figure 3-6

Table 3-6. Existing Traffic Volumes

Roadway	Total Vehicle Trips Per Day
Gold Country Boulevard west of Hazel Avenue from Wednesday, August 20, 2008	
Eastbound	4,953
Westbound	3,825
Total	8,778
Hazel Avenue north of American River Bridge from Wednesday, May 7, 2008	
Northbound	24,161
Southbound	24,501
Total	48,662

Source: County of Sacramento, Department of Transportation 2008

The transportation network in and around the project area is being modified by a project to widen Hazel Avenue to six lanes from Madison Avenue to US Highway 50. Known as the Hazel Avenue Widening Project, it began in 2009 and has a projected completion of February 2011. The project will reduce traffic congestion on Hazel Avenue and will improve access to the American River Parkway with bike paths and pedestrian accessways, compliant with the ADA in all four quadrants of the Hazel Avenue Bridge. The project will also provide a continuous Class II five-foot on-street bike lane on both sides of Hazel Avenue and continuous sidewalks for pedestrians. Construction staging for the project includes the temporary use of 40 to 67 parking spaces at the Hatchery (County of Sacramento, DERA 2006b).

A CHP truck enforcement facility will be constructed in the northbound Hazel Avenue shoulder, between the Folsom South Canal and Gold Country Boulevard, as part of the Hazel Avenue Widening Project. The facility will enhance monitoring and enforcement of truck weights, speeds, and compliance with safety measures in the area (County of Sacramento, DERA 2006b).

The Parkway Trail is popular with bicyclists, pedestrians, and equestrians. It is a 23-mile trail that sees approximately eight million visitors annually (County of Sacramento, Regional Parks 2009). The Hatchery parking lot is popular with parkway users as it is one of the few remaining free parking areas within the American River corridor.

Public transit in the project area is limited to peak period commuter bus service via the Sacramento Regional Transit District Route 109, which traverses Hazel Avenue and US Highway 50 to downtown Sacramento. There are two trips to downtown Sacramento in the AM commuter period, and two trips from downtown Sacramento in the PM commuter period. There is a bus stop on northbound Hazel Avenue, just north of the intersection with Gold Country Boulevard.

Sacramento Mather Airport and Mather Field are approximately six miles southwest of the project area. The project area is not inside the airport's land use planning area (SACOG 1998). No other public or private airports or airstrips are within two miles of the project area.

3.10 Energy

3.10.1 Power Facilities

There is a hydroelectric power plant on the north side of the Nimbus Dam. Two water channels (penstocks) in the dam feed two 7,700-kilowatt generators. All flows up to 5,000 cfs pass through the power plant to ensure maximum power generation. Flows in excess of 5,000 cfs bypass the power plant and are not used to generate electricity. The Nimbus Dam power plant, which generates an average of 61 gigawatt-hours (GWh) annually, is a run-of-the-river plant and provides station service backup for the Folsom Dam power plant. The Nimbus power plant is operated by Reclamation, with power distributed by WAPA.

3.10.2 Power Plant Operations

The Folsom Dam power plant is an important source of electrical energy for northern California. It provides supplemental power during peak demand hours. When electrical demands are low, power plant operation is not necessary; thus, no water is released, apart from that due to flood control or other river operations, and the water releases are highly variable. Lake Natoma, behind Nimbus Dam, is an afterbay or regulating reservoir for Folsom Dam. It stores these variable releases of water and reregulates them to a steady flow downstream in the American River. Because of this steady flow, the Nimbus Dam power plant operates continuously. At operational load, approximately 2,500 cfs of water is released through each of the two Nimbus Dam power plant turbines. All releases exceeding 5,000 cfs pass through the spillway gates.

The amount of electrical energy generated at any time is a function of the difference in Nimbus tailrace and Lake Natoma water surface elevations, along with the amount of water released through the power plant. The average elevation differential between Lake Natoma and the tailrace is about 41 feet. At that head, the energy output of each unit changes about 0.1 megawatt (MW) per a change of 45 cfs through the unit, or 2.2 kilowatts per cfs.

The Nimbus Dam power plant is not a significant source of electrical energy. It accounts for less than one percent of the 2.044 million kilowatts of electricity generating capacity of the eight hydropower plants in the CVP.

3.11 Air Quality

3.11.1 Terminology

The term pollutant emissions refers to the amount (usually stated as a weight) of one or more specific compounds introduced into the atmosphere by a source or group of sources. In practice, most pollutant emissions data are presented as emission rates: the amount of pollutants emitted during a specified increment of time or during a specified increment of emission source activity. Typical measurement units for emission rates on a time basis include pounds per hour, pounds per day, or tons per year. Typical measurement units for emission rates on a source activity basis include pounds per thousand gallons of fuel burned, pounds per ton of material processed, and grams per vehicle mile of travel.

The term ambient air quality refers to the atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) actually experienced at a particular geographic location that may be some distance from the source of the relevant pollutant emissions. The ambient air quality levels actually measured at a particular location are determined by the interactions among three groups of factors:

- Emissions—The types, amounts, and locations of pollutants emitted into the atmosphere;
- Meteorology—The physical processes affecting the distribution, dilution, and removal of these pollutants; and
- Chemistry—Any chemical reactions that transform pollutant emissions into other chemical substances.

In a regulatory context, ambient air refers to outdoor locations to which the general public has access. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million by volume).

Air pollutants are often characterized as primary or secondary pollutants. Primary pollutants are those emitted directly into the atmosphere (such as carbon monoxide, sulfur dioxide, lead particulates, and hydrogen sulfide); secondary pollutants are those formed through chemical reactions in the atmosphere (such as ozone, nitrogen dioxide, and sulfate particles); these chemical reactions usually involve primary pollutants, normal constituents of the atmosphere, and other secondary pollutants. Those compounds that react to form secondary pollutants are referred to as reactive pollutants, pollutant precursors, or precursor emission products. Some air pollutants (such as many organic gases and suspended particulate matter) are a combination of primary and secondary pollutants.

3.11.2 Air Quality Standards

Federal and state air quality management programs have evolved using two distinct management approaches:

- The State Implementation Plan (SIP) process of setting ambient air quality standards for acceptable exposure to air pollutants, conducting monitoring programs to identify locations experiencing air quality problems, and then developing programs and regulations designed to reduce or eliminate those problems, and
- The Hazardous Air Pollutant (HAP) regulatory process, identifying specific chemical substances that are potentially hazardous to human health, and then setting emission standards to regulate the amount of those substances that can be released by individual commercial or industrial facilities or by specific types of equipment.

Criteria Air Pollutants

Air quality programs based on ambient air quality standards typically address air pollutants that are produced in large quantities by widespread types of emission sources and that are of public health concern because of their toxic properties. The EPA has established ambient air quality standards for several different pollutants, which often are referred to as criteria pollutants (ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, suspended particulate matter, and lead). Standards for suspended particulate matter have been set for two size fractions: inhalable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). Federal ambient air quality standards are based primarily on evidence of acute and chronic health effects. Federal ambient air quality standards apply to outdoor locations to which the general public has access.

Some states have adopted ambient air quality standards that are more stringent than the comparable federal standards or address pollutants that are not covered by federal ambient air quality standards. Most state ambient air quality standards are based primarily on health effects data but can reflect other considerations, such as protection of crops and materials, and avoidance of nuisance conditions, such as objectionable odors.

Air pollutants covered by federal and state ambient air quality standards can be categorized by the nature of their toxic effects as follows:

- Irritants, such as ozone, particulate matter, nitrogen dioxide, sulfur dioxide, sulfate particles, hydrogen sulfide, and vinyl chloride, which affect the respiratory system, eyes, mucous membranes, or the skin;
- Asphyxiants, such as carbon monoxide and nitric oxide, which displace oxygen or interfere with oxygen transfer in the circulatory system, affecting the cardiovascular and central nervous systems;
- Necrotic agents, such as ozone, nitrogen dioxide, and sulfur dioxide, which directly cause cell death; or

- Systemic poisons, such as lead particles, which affect a range of tissues, organs, and metabolic processes.

Ozone, suspended particulate matter, and carbon monoxide are the air pollutants of greatest concern in most parts of the country. Ozone is a strong oxidizing agent that reacts with a wide range of materials and biological tissues. Ozone is a respiratory irritant that can have acute and chronic effects on the respiratory system. Recognized effects include reduced pulmonary function, pulmonary inflammation, increased airway reactivity, aggravation of existing respiratory diseases (such as asthma, bronchitis, and emphysema), physical damage to lung tissue, decreased exercise performance, and increased susceptibility to respiratory infections. In addition, ozone is a necrotic agent that causes significant damage to leaf tissues of crops and natural vegetation. Ozone also damages many materials by acting as a chemical oxidizing agent. Because of its chemical activity, indoor ozone levels are usually much lower than outdoor levels.

Suspended particulate matter represents a diverse mixture of solid and liquid material, having size, shape, and density characteristics that allow the material to remain suspended for considerable lengths of time. The physical and chemical composition of suspended particulate matter is highly variable, resulting in a range of public health concerns.

Many components of suspended particulate matter are respiratory irritants. Some components, such as crystalline or fibrous minerals, are primarily physical irritants. Other components are chemical irritants, such as sulfates, nitrates, and various organic chemicals. Suspended particulate matter also can contain compounds (such as heavy metals and various organic compounds) that are systemic toxins or necrotic agents. Suspended particulate matter or compounds adsorbed on the surface of particles can also be carcinogenic (cancer causing) or mutagenic (increase the frequency or extent of mutation) chemicals.

Public health concerns for suspended particulate matter focus on the particle size ranges likely to reach the lower respiratory tract or the lungs. PM_{10} represents particle size categories that are likely to reach either the lower respiratory tract or the lungs after being inhaled; $PM_{2.5}$ represents particle size categories likely to penetrate to the lungs after being inhaled. The 10 in PM_{10} and the 2.5 in $PM_{2.5}$ are not upper size limits. These numbers refer to the particle size range collected with 50 percent mass efficiency by certified sampling devices; larger particles are collected with lower efficiencies, and smaller particles are collected with higher efficiencies.

In addition to public health impacts, suspended particulate matter causes a variety of material damage and nuisance effects: abrasion; corrosion, pitting, and other chemical reactions on material surfaces; soiling; and transportation hazards due to visibility impairment.

Carbon monoxide is a public health concern because it combines readily with hemoglobin in the blood and thus reduces the amount of oxygen transported to body tissues. Relatively low concentrations of carbon monoxide can significantly affect the amount of oxygen in the blood stream since carbon monoxide binds to hemoglobin 200 to 250 times more strongly than oxygen. Both the cardiovascular system and the central nervous system can be affected when only 2.5 to 4.0 percent of the hemoglobin in the blood is bound to carbon monoxide rather than to oxygen. Because of its low chemical reactivity and low solubility, indoor carbon monoxide levels usually are similar to outdoor levels.

Hazardous Air Pollutants

Air quality programs based on regulation of other hazardous substances typically address chemicals used or produced by limited categories of industrial facilities. Programs regulating hazardous air pollutants focus on the following;

- Substances that alter or damage the genes and chromosomes in cells (mutagens);
- Substances that affect cells in ways that can lead to uncontrolled cancerous cell growth (carcinogens);
- Substances that can cause birth defects or other developmental abnormalities (teratogens);
- Substances with serious acute toxicity effects; and
- Substances that undergo radioactive decay processes, resulting in the release of ionizing radiation.

Federal air quality management programs for hazardous air pollutants focus on setting emission limits for particular industrial processes rather than setting ambient exposure standards. Some states have established ambient exposure guidelines for various hazardous air pollutants and use those guidelines as part of the permit review process for industrial emission sources.

3.11.3 Air Quality Planning Programs

The federal Clean Air Act (CAA) requires each state to identify areas that have ambient air quality in violation of federal standards. States are required to develop, adopt, and implement a SIP to achieve, maintain, and enforce federal ambient air quality standards in these nonattainment areas. Deadlines for achieving the federal air quality standards vary according to air pollutant and the severity of air quality problems. The SIP must be submitted to and approved by the EPA. SIP elements are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated.

The status of areas with respect to federal ambient air quality standards is categorized as nonattainment, attainment (better than national standards), unclassifiable, or attainment/cannot be classified. For most air pollutants, initial federal status designations are made using only two categories (either nonattainment and unclassifiable/attainment, or nonattainment and attainment/cannot be classified). For simplicity and clarity, the federal unclassifiable and attainment/cannot be classified designations are called unclassified in this document. The unclassified designation includes attainment areas that comply with federal standards as well as areas for which monitoring data are lacking. Unclassified areas are treated as attainment areas for most regulatory purposes.

Simple attainment designations generally are used only for areas that transition from a nonattainment status to an attainment status. Areas that have been reclassified from nonattainment to attainment of federal air quality standards are automatically considered maintenance areas, although this designation is seldom noted in status listings.

3.11.4 Regulatory Considerations

Many states, including California, established air quality regulatory programs before federal programs were established. The first federal air quality legislation was the Air Pollution Control Act of 1955, which provided funding to the US Public Health Service for research into air pollution and air pollution control. The 1955 act was amended and renamed the CAA in 1963. This provided grants to state and local air pollution control agencies but limited direct federal activity to research, education, and advisory functions, plus a mediation role for interstate disputes. The federal role was expanded in 1965 with congressional authorization for uniform federal emission standards for motor vehicles, although no motor vehicle standards were adopted until after the 1970 amendments to the CAA. In 1967, Congress authorized federal enforcement procedures for air pollution problems caused by interstate transport of pollutants.

The 1970 amendments effectively rewrote the CAA and established a significant federal air quality regulatory role. The amendments established several planning and regulatory programs, including the following:

- Adoption of national ambient air quality standards;
- Requirements for states to establish ambient air quality monitoring programs;
- Requirements for states to implement planning programs to achieve the national ambient air quality standards by fixed deadlines;
- Adoption of emission standards for motor vehicles and other types of mobile sources;
- Adoption of emission standards for major new industrial facilities as new source performance standards;
- Adoption of National Emission Standards for Hazardous Air Pollutants;
- Preconstruction review of major new industrial facilities or major modifications to existing facilities as the new source review (NSR) program for nonattainment areas, and the prevention of significant deterioration (PSD) program for attainment areas;

- Continued federal grant programs to state and local air pollution control agencies; and
- Authorized citizen suits to enforce provisions of Section 304 of the act.

The EPA was created in 1971 and was given responsibility for implementing the CAA.

The 1977 amendments to the CAA revised and expanded some of the regulatory programs established by the 1970 amendments. The 1990 amendments to the CAA made further revisions to the established regulatory programs and added some new regulatory and planning programs, as follows:

- Operating permits for major industrial facilities (Title V permits);
- Additional programs to regulate an extensive list of hazardous air pollutants;
- Emissions allocation programs to regulate sulfur emissions from electrical power generation facilities;
- Programs to reduce emissions of compounds that deplete stratospheric ozone levels; and
- Requirements for federal agencies to demonstrate that actions they undertake are consistent with federally mandated SIPs.

In addition, the 1990 amendments to the CAA recognized the authority of tribal governments to establish air quality management programs and to enforce those portions of the CAA applicable to tribal lands.

In general, states have assumed primary responsibility for enforcing most federal industrial source emission standards and industrial source review requirements, with EPA exercising formal review and oversight responsibilities. Many states have air quality permit programs that extend to emission sources not covered by federal NSR or PSD requirements. State air quality permit requirements generally are integrated with federal NSR, PSD, and Title V requirements, resulting in a consolidated permit program. Under most consolidated permit programs, basic state permit requirements apply to all sources that are not specifically exempted. Additional NSR and PSD program requirements (including EPA review of the permit) become applicable if sources exceed various size or emission thresholds.

In California, air quality regulation is a joint responsibility between the California Air Resources Board (CARB) and local air quality management agencies. Local agencies are either a single county or a multi-county agency, typically called either an air pollution control district (APCD) or an air quality management district. The Sacramento Metropolitan Air Quality Management District (SMAQMD) has local air quality management authority in Sacramento County. APCDs and air quality management districts have primary responsibility for most air quality regulatory programs, with

CARB exercising oversight responsibilities. CARB directly implements statewide regulatory programs for motor vehicles, portable equipment, and hazardous air pollutants.

3.11.5 Clean Air Act Conformity

Section 176(c) of the CAA requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. The EPA has promulgated separate rules that establish conformity analysis procedures for highway/mass-transit projects (40 CFR, Part 93, Subpart A) and for other (general) federal agency actions (40 CFR, Part 93, Subpart B). General conformity requirements are potentially applicable to many federal agency actions but apply only to those aspects of an action that involve on-going federal agency responsibility and control over direct or indirect sources of air pollutant emissions.

The EPA conformity rule establishes a process that is intended to demonstrate that the proposed federal action would not result in the following:

- Cause or contribute to new violations of federal air quality standards;
- Increase the frequency or severity of existing violations of federal air quality standards; or
- Delay the timely attainment of federal air quality standards.

The EPA general conformity rule applies to federal actions in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements of the conformity rule are called de minimis levels. Emissions associated with stationary sources that are subject to permit programs incorporated into the SIP are not counted against the de minimis threshold.

Compliance with the conformity rule can be demonstrated in several ways. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant de minimis level. If net emissions increases exceed the relevant de minimis value, a formal conformity determination process must be followed. Federal agency actions subject to the general conformity rule cannot proceed until there is a demonstration of consistency with the SIP through one of the following mechanisms:

- Performing dispersion modeling analyses, demonstrating that direct and indirect emissions from the federal action would not cause or contribute to violations of federal ambient air quality standards;
- Showing that direct and indirect emissions from the federal action are specifically identified and accounted for in an approved SIP;

- Showing that direct and indirect emissions associated with the federal agency action are accommodated within emission forecasts contained in an approved SIP;
- Showing that emissions associated with future conditions will not exceed emissions that would occur from a continuation of historical activity levels;
- Arranging emissions offsets to fully compensate for the net emissions increase associated with the action;
- Obtaining a commitment from the relevant air quality management agency to amend the SIP to account for direct and indirect emissions from the federal agency action; or
- In the case of regional water or wastewater projects, showing that any population growth accommodated by such projects is consistent with growth projections used in the applicable SIP.

Dispersion modeling analyses can be used to demonstrate conformity only in the case of primary pollutants, such as carbon monoxide or directly emitted PM_{10}. Modeling analyses cannot be used to demonstrate conformity for secondary pollutants, such as ozone or photochemically generated particulate matter because the available modeling techniques generally are not sensitive to site-specific emissions.

3.11.6 Existing Air Quality Conditions

The air pollutants of greatest concern in Sacramento County are ozone, suspended particulate matter, and carbon monoxide. Sacramento County is classified as a serious federal nonattainment area for the federal 8-hour ozone standard, as a moderate nonattainment area for the federal PM_{10} standard, and as a nonattainment area for the federal $PM_{2.5}$ standard. Sacramento County is considered a maintenance area for the federal carbon monoxide standard and is considered either attainment or unclassified for the other federal ambient air quality standards (nitrogen dioxide, sulfur dioxide, and lead). Sacramento County is also designated as a nonattainment area for the state ozone, PM_{10}, and $PM_{2.5}$ standards.

The federal nonattainment and maintenance designations for Sacramento County mean that federal agency actions in the county are subject to CAA conformity review requirements. The relevant CAA conformity de minimis thresholds are as follows:

- 50 tons per year for nitrogen oxide emissions or for reactive organic compound emissions (as ozone precursors);
- 100 tons per year for PM_{10} emissions or for $PM_{2.5}$ emissions; and100 tons per year for carbon monoxide emissions.

3.11.7 Greenhouse Gases

Current Trends. There is no synthesized data that inventories the current trends of greenhouse gas emissions specific to the project area or regionally. Detailed inventory by industry is available for the state of California from 1990 to 2004 to provide the baseline and to track targeted reductions. In summary by far most of the greenhouse gases in California are generated by the energy sector and more specifically by fuel combustion activities by vehicles, manufacturing and power generation. Transportation, mostly road transportation, accounts for 38 percent of the total gross emissions generated in the state. Electrical generation accounts for 25 percent, and manufacturing and industrial uses make up 20 percent of the total gross emissions. Agriculture and residential uses generate six percent each and commercial/institutional sources account for three percent.

The annual metric tonnes of CO_2 equivalent emitted have increased during the inventory period for transportation, electrical power generation and agriculture. There have been decreases in emissions from manufacturing and construction and from residential and commercial/institutional sources (CARB 2007a, 2007b).

Projected Trends. There is considerable uncertainty in projections of greenhouse gas emissions. Regardless of California's targeted reductions, future levels of greenhouse gases in the atmosphere will depend on human activities globally. Policy and development outcomes will affect emissions from carbon-based fossil fuel burning and other human activities driving climate change.

Climate researchers working in California have used scenarios developed by the IPCC as the basis for modeling the inputs of greenhouse gases into climate models (IPCC 2007). These scenarios do not assume explicit climate change or emission-reducing policies such as the ones in place in California. One lower-emissions scenario (called "B1") projects future decreases in CO2 concentrations following significant "decarbonization" of the economy. If CO2 emissions continue unabated, high emissions will ensue under a scenario called "A1fi" (for fossil fuel-intensive). The "A2" scenario describes a medium-high emissions scenario. However, the estimated emissions growth from 2000 to 2007 worldwide has been higher than even the most fossil fuel intensive scenario described above. Climate projections derived from these scenarios should be viewed as a set of possible outcomes, each having an unspecified degree of uncertainty and not as detailed predictions (Cayan et al. 2008; IPCC 2007).

The California Governor's Executive Order S-3-05 calls for an 80 percent reduction in GHG emissions below 1990 levels by 2050 (California 2005). If the industrialized world were to follow California's lead, and newly industrializing nations followed a low carbon emission pathway, global emissions might remain below the lower B1 emissions scenario. However, even if global emissions stay below the lower emissions scenario, some impacts from greenhouse gases in the atmosphere are inevitable. Evidence indicates that even if actions could be taken to immediately curtail emissions, the potency of greenhouse gases that have already built up, their long atmospheric lifetimes, and the inertia of the Earth's climate system, it could still result in additional temperature increases over the next century (Cayan et al. 2008).

3.12 Noise and Vibration

3.12.1 Noise Terminology

Sound is caused by vibrations that generate waves of minute air pressure fluctuations in the air. Air pressure fluctuations that occur from 20 to 20,000 times per second can be detected as audible sound. The number of pressure fluctuations per second is normally reported as cycles per second or Hertz (Hz). Different vibration frequencies produce different tonal qualities for the resulting sound. In general, sound waves travel away from the noise source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source.

Decibel Scales

Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hz, is less sensitive to higher and lower sound frequencies, and is least sensitive to sound frequencies below 250 Hz. Peak sensitivity to pure tones typically occurs at frequencies between 2,000 Hz and 6,000 Hz. Relative sensitivity remains fairly high between about 250 and 2,000 Hz. Relative sensitivity drops off slightly above 7,000 Hz and drops off significantly below 200 Hz. In addition, relative sensitivity to different acoustic frequencies also varies with the intensity of the sound. Several different frequency weighting schemes have been developed, using different decibel (dB) adjustment values for each octave or third octave interval. Some of these weighting schemes are intended to approximate the way the human ear responds to noise levels; others are designed to account for the response of building materials to airborne vibrations and sound. The most commonly used decibel weighting schemes are the A-weighted and C-weighted scales.

The A-weighted decibel scale (dBA) is normally used to approximate human hearing response to sound. The A-weighted scale significantly reduces the measured pressure level for low frequency sounds, while slightly increasing the measured pressure level for some middle frequency sounds. The C-weighted decibel scale (dBC) is often used to characterize low frequency sounds capable of inducing vibrations in buildings or other structures. The C-weighted scale makes only minor reductions to the measured pressure level for low frequency components of a sound, while making slightly greater reductions to high frequency components than the A-weighted scale.

Common Noise Descriptors

Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels (Leq) are used to develop single-value descriptions of average noise exposure over various periods of time. Such average noise exposure ratings often include additional weighting factors for annoyance potential due to time of day or other considerations. The Leq data used for these average noise exposure descriptors are generally based on dBA measurements, although other weighting systems are used for special conditions, such as blasting noise.

Average noise exposure over a 24-hour period is often presented as a day-night average sound level (Ldn) or a community noise equivalent level (CNEL). Ldn values are calculated from hourly Leq values, with the Leq values for the nighttime period (10 PM to 7 AM) increased by 10 dB to reflect the greater disturbance potential from nighttime noises. CNEL values are similar to Ldn values but include a 5 dB annoyance adjustment for evening (7 PM to 10 PM) Leq values, in addition to the 10 dB adjustment for nighttime Leq values. Except in unusual situations, the CNEL descriptor will be within 1.5 dB of the Ldn descriptor for the same set of noise measurements. Unless specifically noted otherwise, Ldn and CNEL values are assumed to be based on dBA measurements.

Working with Decibel Values

The nature of dB scales is such that individual dB ratings for different noise sources cannot be added directly to give the dB rating of the combination of these sources. Two noise sources producing equal dB ratings at a given location will produce a composite noise level 3 dB greater than either sound alone. When two noise sources differ by 10 dB, the composite noise level will be only 0.4 dB greater than the louder source alone. Most people have difficulty distinguishing the louder of two noise sources that differ by less than 1.5 to 2 dB. In general, a 10 dB increase in noise level is perceived as a doubling in loudness. A 2 dB increase represents a 15 percent increase in loudness, a 3 dB increase is a 23 percent increase in loudness, and a 5 dB increase is a 41 percent increase in loudness.

When distance is the only factor considered, sound levels from an isolated noise source typically decrease by about 6 dB for every doubling of distance away from the noise source. When the noise source is essentially a continuous line (e.g., vehicle traffic on a highway), noise levels decrease by about 3 dB for every doubling of distance.

3.12.2 Regulatory Considerations

Various federal, state, and local agencies have developed guidelines for evaluating land use compatibility under different noise level ranges. The federal Noise Control Act of 1972 (Public Law 92-574) established a requirement that all federal agencies must administer their programs in a manner that promotes an environment free from noise that jeopardizes public health or welfare. The EPA is responsible for informing the public about identifiable effects of noise on public health or welfare, publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety, coordinating federal research and activities related to noise control, and establishing federal noise emission standards for selected products distributed in interstate commerce. Also, the federal Noise Control Act directs federal agencies to comply with applicable federal, state, interstate, and local noise control regulations.

Although the EPA was given major public information and federal agency coordination roles, each federal agency retains authority to adopt noise regulations pertaining to agency programs. The EPA can require other federal agencies to justify their noise regulations in terms of the federal Noise Control Act policy requirements. The Occupational Safety and Health Administration retains primary authority for setting workplace noise exposure standards. Due to aviation safety considerations, the Federal Aviation Administration retains primary jurisdiction over aircraft noise standards.

Federal Criteria and Standards

In response to the requirements of the federal Noise Control Act, the EPA in 1974 identified indoor and outdoor noise limits to protect public health and welfare (hearing damage, sleep disturbance, and communication disruption; EPA 1974). Outdoor Ldn values of 55 dB and indoor Ldn values of 45 dB are identified as desirable to protect against speech interference and sleep disturbance for residential, educational, and health care areas. Noise level criteria to protect against hearing damage in commercial and industrial areas are identified as 24-hour Leq values of 70 dB (both outdoors and indoors).

In 1980 the Federal Interagency Committee on Urban Noise (FICUN) developed guidelines to evaluate whether existing and proposed land uses are compatible with prevailing noise levels (FICUN 1980). The primary federal agencies participating in the FICUN report were the EPA, the Department of Defense, the Department of Housing and Urban Development, the Department of Transportation, and the Veterans Administration. The FICUN guidelines addressed land use compatibility and recommended building design considerations according to three noise level categories:

- Zone 1 = Ldn or CNEL levels below 65 dB;
- Zone 2 = Ldn or CNEL levels of 65 to 75 dB; and
- Zone 3 = Ldn or CNEL levels above 75 dB.

The FICUN guidelines indicate that all land uses are compatible with Zone 1 noise levels. Educational and residential land uses generally are not compatible with Zone 2 noise levels unless special acoustic treatments and designs are used to ensure acceptable interior noise levels. Residential and educational land uses are not compatible with Zone 3 noise levels. Industrial and manufacturing land uses may be acceptable in Zone 3 areas if special building designs and other measures are implemented.

The US Federal Highway Administration has adopted criteria for evaluating impacts of noise from federally funded highway projects and for determining whether these impacts are sufficient to justify funding noise mitigation actions (47 FR 131:29653-29656). The Federal Highway Administration noise abatement criteria are based on peak hour Leq noise levels, not Ldn or 24-hour Leq values. The peak 1-hour Leq criteria for residential, educational, and health care facilities are 67 dB outdoors and 52 dB indoors. The peak 1-hour Leq criterion for commercial and industrial areas is 72 dB (outdoors).

The relationship between peak hour Leq values and associated Ldn values depends on the distribution of traffic over the entire day. There is no precise way to convert a peak hour Leq value to an Ldn value. In urban areas with heavy traffic, the peak hour Leq value is typically 2 to 4 dB lower than the daily Ldn value. In less heavily developed areas, the peak hour Leq is often equal to the daily Ldn value. For rural areas with little nighttime traffic, the peak hour Leq value is often 3 to 4 dB greater than the daily Ldn value.

The US Department of Housing and Urban Development has established guidelines for evaluating noise impacts on residential projects seeking financial support under various grant programs (44 FR 135:40860-40866). Sites are generally considered acceptable for residential use if they are exposed to outdoor Ldn values of 65 dB or less. Sites are considered normally unacceptable if they are exposed to outdoor Ldn values of 65 to 75 dB; sites are considered unacceptable if they are exposed to outdoor Ldn values above 75 dB.

State Criteria and Standards

The California Governor's Office of Planning and Research (2003) has published guidelines for the noise element of local general plans. These guidelines include a noise level/land use compatibility chart that categorizes outdoor CNEL/Ldn levels into as many as four compatibility categories (normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable), depending on land use. For many land uses, the chart shows overlapping CNEL/Ldn ranges for two or more compatibility categories.

The noise element guidelines chart identifies the normally acceptable range for low density residential uses as CNEL/Ldn values less than 60 dB, while the conditionally acceptable range is 55 to 70 dB. The normally acceptable range for high density residential uses is identified as CNEL/Ldn values below 65 dB, while the conditionally acceptable range is identified as 60 to 70 dB. For educational and medical facilities, CNEL/Ldn values below 70 dB are considered normally acceptable, while values of 60 to 70 dB are considered conditionally acceptable. For office and commercial land uses, CNEL/Ldn values below 70 dB are considered normally acceptable, while values of 67.5 to 77.5 are categorized as conditionally acceptable. The overlapping CNEL/Ldn ranges are intended to indicate that local conditions (existing noise levels and community attitudes toward dominant noise sources) should be considered in evaluating land use compatibility at specific locations.

Local Criteria and Standards

Cities and counties in California are required to adopt a noise element as part of their general plan. Many cities and counties have incorporated the California Department of Health Services land use compatibility guidelines as a key item in the general plan noise element while other cities and counties have developed their own land use compatibility guidelines. In addition to local general plan noise elements, some cities and counties have adopted noise ordinances to legally define noise nuisances. Local noise ordinances vary considerably in their format and coverage. Many noise ordinances establish property line performance standards for different land use or zoning categories. There is considerable variation among communities as to the types of noise sources covered under local noise ordinances.

Sacramento County has adopted the following land use compatibility criteria as part of the noise element of the county general plan (County of Sacramento 1998):

- Residential
  - Acceptable—CNEL less than 60 dBA,
  - Conditionally Acceptable—CNEL of 60 to 75 dBA,
  - Unacceptable—CNEL over 75 dBA;
- Agricultural residential
  - Acceptable—CNEL less than 65 dBA,
  - Conditionally Acceptable—CNEL of 65 to 75 dBA,
  - Unacceptable—CNEL over 75 dBA;
- Motels, hotels, and transient lodging
  - Acceptable—CNEL less than 60 dBA,
  - Conditionally acceptable—CNEL of 60 to 75 dBA,
  - Unacceptable—CNEL over 75 dBA;
- Schools, libraries, churches, hospitals, and nursing homes
  - Normally Acceptable—CNEL less than 60 dBA,
  - Conditionally Acceptable—CNEL of 60 to 70 dBA,
  - Unacceptable—CNEL over 70 dBA;
- Auditoriums, concert halls, amphitheaters, and sports arenas
  - Acceptable—CNEL less than 60 dBA,
  - Conditionally Acceptable—CNEL of 60 to 75 dBA,
  - Unacceptable—CNEL over 75 dBA;
- Playgrounds and neighborhood parks
  - Acceptable—CNEL less than 70 dBA,
  - Normally Unacceptable—CNEL of 70 to 75 dBA,
  - Unacceptable—CNEL over 75 dBA;
- Golf courses, riding stables, water recreation, and cemeteries
  - Acceptable—CNEL less than 75 dBA,
  - Normally Unacceptable—CNEL of 70 to 80 dBA,
  - Unacceptable—CNEL over 80 dBA;
- Office buildings, business commercial, and professional
  - Acceptable—CNEL less than 65 dBA,

- Conditionally Acceptable—CNEL of 65 to 77.5 dBA,
- Unacceptable—CNEL over 75 dBA;

- Industrial, manufacturing, utilities, and agriculture
  - Acceptable—CNEL less than 70 dBA,
  - Conditionally Acceptable—CNEL of 70 to 80 dBA,
  - Unacceptable = CNEL over 80 dBA.

Land uses proposed for acceptable noise exposure conditions do not require any special noise study or noise mitigation measures. Land uses proposed for conditionally acceptable noise exposure require a noise study and inclusion of protective measures as needed for the intended use and to satisfy policies of the general plan noise element. Land uses proposed for unacceptable noise exposure conditions should be denied.

In addition to the general land use compatibility standards, the Sacramento County general plan noise element identifies limits for noise generated by nontransportation sources affecting residential land uses, as shown in Table 3-7.

Table 3-7. Noise Limits in the Sacramento County General Plan

Statistical Noise Level Descriptor	Exterior Noise Level Standard, dBA	
	Daytime, 7 AM to 10 PM	Nighttime, 10 PM to 7 AM
L50	50	45
Lmax	70	65

Source: County of Sacramento 1998

The L50 noise level is the level exceeded 50 percent of the time; the Lmax noise level is the maximum noise level.

Sacramento County has adopted a noise ordinance as part of its County Code (Title 6, Chapter 6.68 – Noise Control). The noise ordinance establishes the limits identified in Table 3-8 for noise sources affecting residential and agricultural zones:

The noise ordinance includes adjustments to these limits for noise sources that include impulsive or pure tone noise and for noise from speech or music sources. The noise ordinance also includes adjustments for situations in which the ambient noise level exceeds the specified standards.

Construction activities are exempt from the provisions of the Sacramento noise ordinance, provided construction is limited to 6 AM to 8 PM on weekdays and 7 AM to 8 PM on Saturdays and Sundays. Construction activity outside these time limits is allowed when unforeseen or unavoidable conditions require that work in progress be continued until a specific construction activity is completed.

Table 3-8. Noise Limits in the Sacramento County Noise Ordinance

Measurement Location	Time Period	Noise Limit, dBA	Cumulative Duration
Outdoors on property in residential or agricultural zones	7 AM to 10 PM	55 dBA	30 minutes or more in any hour
		60 dBA	5 to 15 minutes in any hour
		65 dBA	1 to 5 minutes in any hour
		70 dBA	Up to 1 minute in any hour
		75 dBA	At any time
	10 PM to 7 AM	50 dBA	30 minutes or more in any hour
		55 dBA	5 to 15 minutes in any hour
		60 dBA	1 to 5 minutes in any hour
		65 dBA	Up to 1 minute in any hour
		70 dBA	At any time

Source: County of Sacramento 2009

3.12.3 Existing Noise Conditions

Ambient noise levels have not been measured at the Hatchery. The environmental assessment and EIR documents prepared for the Hazel Avenue Widening Project showed hourly noise levels of 60 to 62 dBA for three locations in the American River Recreation Area near the Hazel Avenue Bridge (County of Sacramento, DERA 2006b). The reported noise measurements suggest that ambient CNEL levels would be about 64 dBA near the Hazel Avenue Bridge and somewhat lower at greater distances from Hazel Avenue.

3.12.4 Groundborne Vibrations

Groundborne vibrations can be a source of annoyance to people or of structural damage to some types of buildings. Although vibration measurements can be presented in many different forms, peak particle velocity is the common unit of measure used to assess building damage potential. The California Department of Transportation (Caltrans) has identified vibration impact criteria for both building damage potential and human annoyance (Caltrans 2002, 2004). Both human annoyance effects and building damage effects depend in part on whether vibration events are isolated discrete events or are a relatively continuous episode of vibrations. In general, there is less sensitivity to single events than to continuous events or frequently repeated events. Table 3-9 is a summary of Caltrans criteria for assessing the effects of groundborne vibration.

Table 3-9. Summary of Caltrans Vibration Criteria

Type of Criteria	Condition	Peak Particle Velocity (Inches per Second)	
		Transient Sources	Continuous or Frequent Sources
Human Response	Barely perceptible	0.04	0.01
	Distinctly perceptible	0.25	0.04
	Strongly perceptible; may be annoying to some people in buildings	0.9	0.10
	Severe; unpleasant for people in buildings; unacceptable to pedestrians on bridges	2.0	0.4
Building Damage	Extremely fragile historic buildings, ruins, and ancient monuments	0.12	0.08
	Fragile buildings	0.2	0.1
	Historic and some old buildings	0.5	0.25
	Older residential structures	0.5	0.3
	Newer residential structures	1.0	0.5
	Modern industrial/commercial buildings	2.0	0.5

Source: Caltrans 2002, 2004

3.13 Land Use

3.13.1 Project Area

The project area is within Rancho Cordova, Sacramento County, California. The Hatchery is owned by Reclamation and is managed by the CDFG, which leases the land from Reclamation.

The project area is a 74-acre area in Rancho Cordova, from the Nimbus Dam, downstream along the lower American River, to about 500 feet downstream of the USGS gaging cable. The project area includes the lower American River, the north and south banks of the river, the Hatchery complex, and an adjacent parking lot. It also includes Nimbus Shoals, which is also owned by Reclamation and is on the south bank of the river, downstream of the Nimbus Dam and stilling basin and east of Hazel Avenue.

3.13.2 Existing Land Use in the Project Area

The region of influence of the proposed project covers the Hatchery area and Nimbus Shoals. It also includes the American River Parkway, a river corridor and open space greenbelt that runs 23 miles, from Folsom Dam at the northeast to the American River's confluence with the Sacramento River at the southwest (County of Sacramento, Planning and Community Development Department 2008). Land use in the parkway is governed by the American River Parkway Plan.

Hazel Avenue and the Hazel Avenue Bridge run directly through the project area, dissecting it into an eastern and western portion. West of Hazel Avenue to its confluence with the Sacramento River, the American River Parkway is operated by the Sacramento County Department of Parks and Recreation. The portion of the American River Parkway east of Hazel Avenue is operated by the State of California.

The lower American River is a widely used recreational waterway. Fishing, rafting, boating, kayaking, bicycling, jogging, walking, swimming, bird watching, and picnicking are just some of the activities people pursue in this area.

In addition to the river, the parkway includes 32 miles of multiuse trails (pedestrian, equestrian, and bicycle), known as the Jedediah Smith Memorial Trail, parallel to the American River from Folsom to downtown Sacramento. The parkway abuts Rancho Cordova's northern boundary with miles of river frontage and is accessible from numerous locations in Rancho Cordova.

Along with the parkway component, existing land use within the project area includes the Nimbus Dam, fish management, fishing, rowing, trails, transportation, and parking. These uses are described in more detail below. Other recreation activities are discussed in greater detail in Section 3.3.

Nimbus Dam

The Nimbus Dam impounds Lake Natoma downstream of the Folsom Dam and regulates the releases from the Folsom Reservoir to the lower American River.

Hatchery Visitor Center

The Hatchery complex, which includes the Nimbus Fish Hatchery for chinook salmon and the American River Trout Hatchery, is west of Hazel Avenue. The Hatchery complex includes a large public parking lot with 170 spaces, a fish flume, a visitor plaza, the fish ladder and weir, and the visitor center.

Parking

Public parking in the project's vicinity is constituted by 170 spaces at the Hatchery, 20 spaces at Nimbus Shoals, 120 spaces at the CSUS Aquatic Center, 231 spaces at the Nimbus Shoals Day-Use Area, and 33 spaces at a county-operated park-and-ride site. During large events held at the CSUS Aquatic Center and at Nimbus Shoals day-use area, it is common for all the spaces to be occupied.

The Hatchery parking area is also one of the sites for the Salmon Festival, a three-day event usually held in October that frequently attracts 20,000 visitors, although 2009's event was cancelled. Participants are bused into the Salmon Festival from remote parking areas, and no parking is permitted at the Hatchery parking lot.

Over 90,000 people visited the Hatchery between July 2007 and June 2008 (CDFG 2008a).

California State University Sacramento Aquatic Center

Located at the south end of Nimbus Dam on Lake Natoma, the CSUS Aquatic Center is home to CSUS's rowing and water ski teams. The Aquatic Center offers a range of water courses to the public, including rowing, boating safety, sailing, windsurfing, personal watercraft use, kayaking, and canoeing. It provides for participation in youth and summer camps. CSUS manages the Aquatic Center through an operating agreement with the CDPR. The facilities include an administrative building with offices and classrooms, equipment storage buildings, launch docks with mooring areas, and a small beach area.

Hazel Avenue/Hazel Bridge

Hazel Avenue is primarily a residential roadway functioning as an important north/south corridor in eastern Sacramento County, which provides one of the limited American River crossings for both Sacramento County and regional travel (County of Sacramento, DERA 2006b). As mentioned previously, Hazel Avenue and the Hazel Avenue Bridge, dissect the project area into an eastern and western portion.

The County of Sacramento Department of Transportation is widening the Hazel Avenue Bridge from four lanes to six lanes to relieve traffic congestion (the Hazel Avenue Widening Project). In addition to vehicular use, the new bridge will accommodate bicycle, pedestrian, and equestrian use. The temporary staging area for the Hazel Avenue project is in the Hatchery parking lot, resulting in a temporary loss of 40 to 67 parking spaces (County of Sacramento, DERA 2006b).

3.13.3 Surrounding Land Uses

Folsom Lake State Recreation Area

The project area is located with the Folsom Lake State Recreation Area (SRA). Reclamation owns the land within Folsom SRA and the park is managed by CDPR. Folsom SRA includes an 18, 000 acre lake that provides many recreational activities. Included within the park is Lake Natoma (California State Parks 2009).

Lake Natoma

Part of the Folsom SRA, Lake Natoma is upstream from the Nimbus Dam and the project area. Lake Natoma is an afterbay of Folsom Dam located about one mile downstream of Folsom Dam at the foot of a steep river gorge (CDPR and Reclamation 2007). Bordering Lake Natoma, the Nimbus Dam has a north-south alignment. Land on the north side of the dam is undeveloped.

There are roughly 14 miles of scenic riparian shoreline surrounding Lake Natoma, the most dramatic being the 300-foot high cliffs of the Lake Natoma Bluffs that line Lake Natoma's Western Shore from Negro Bar to the Mississippi Bar. The Mississippi Bar is an undeveloped area that encompasses roughly 750 acres of river terrace and is the largest upland area along Lake Natoma (CDPR and Reclamation 2007).

Lake Natoma is a long narrow lake with approximately 540 acres of water surface area. About half of the recreational activities on Lake Natoma are aquatic, such as paddling (kayaking, rowing, canoeing, outriggers, etc.), swimming, and fishing.

3.13.4 Regulatory Considerations

The following plans and authorities are applicable to land use as it relates to the proposed project; the relevance of each is further discussed in the Section 3.3, Recreation.

- Folsom State Recreation Area and Folsom Powerhouse State Historic Park Resource Management Plan and General Plan;
- Sacramento County General Plan;
- American River Parkway Plan;
- Rancho Cordova General Plan;
- River Corridor Management Plan for the Lower American River;
- Sacramento Area Council of Governments;
- National Wild and Scenic Rivers Act; and
- California Wild and Scenic Rivers Act.

3.14 Aesthetic, Visual and Scenic Resources

This section describes the visual resources within the region of influence, which is the project area and its surroundings. Visual resources include scenic vistas, scenic roadways, the visual character or quality of the landscape, and nighttime views.

3.14.1 Visual Character of the Region

The proposed project is bounded by the American River and bluffs on the north, the Nimbus Dam, Lake Natoma, and the CSUS Aquatic Center on the east, the Hatchery and associated buildings on the southwest, and Gold Country Boulevard on the south. The Hazel Avenue Bridge intersects the project area (Reclamation 2006b). The Lake Natoma Bluffs extend 150 feet above the western shoreline of Lake Natoma (CDPR and Reclamation 2007). The dominant natural vegetation is typical for the area: scattered oak and willow trees and patches of riparian woodland and riparian scrub vegetation.

The Hazel Avenue crossing of the American River has a high capacity for motorists (Wallace et al. 2003). Northbound views are more plentiful and are of higher scenic quality than southbound views because the American River and bluffs are toward the north; the Hatchery and other developed and urban areas are to the south. In general, the qualities of the scenic landscape increase with distance from these urban developed areas. To the east, the view is of the Nimbus Dam in the foreground, Lake Natoma in the mid-ground, and the foothills of the Sierra Mountains in the distance. The travel speed on Hazel Avenue Bridge is high, but the bridge is long and provides a sweeping view because of its angle (Wallace et al. 2003). The Nimbus weir superstructure is visible from mid-September until early January, when the salmon are spawning (Figure 3-7). The superstructure is removed for the remainder of the year, but the concrete piers remain in place year-round and thus are part of the visual landscape, as shown in Figure 3-8.

Those living in housing on the bluffs above the American River, near the Hatchery, have a view of the river, the Hazel Avenue Bridge, and the diversion weir. The weir is visible during the salmon season, from mid-September until the end of December. There are additional houses south of the project area. Motorists along the Hazel Avenue Bridge as well as residents in the area have no light or glare impacts or light trespass from the Hatchery or weir next to the developments. The area is lit at night for security, with very little lighting. Existing downward lighting elements illuminate the parking lot, the footpath to the river, and the Hatchery (Robinson 2009b). Surface water elevations for Lake Natoma vary by four to seven feet (Wallace et al. 2003). The diversion weir is very visible during the salmon season (mid-September until the end of December).

Figure 3-7: Nimbus Weir with superstructure in place

Figure 3-8: Nimbus Weir with superstructure removed
(Note concrete piers)

3.14.2 Regulatory Framework

Federal

In 1981, the NPS classified the American River as a recreational river, under the National Wild and Scenic Rivers Act. The same designation is given by California under the State Wild and Scenic Rivers system. The American River is a source of public recreation of regional significance (County of Sacramento, DERA 2009a). The National Wild and Scenic Rivers Act protects and enhances the values for which the river was designated, while providing for public recreation and resources uses, which do not adversely impact those values. Adverse impacts on the scenic attributes of the American River are a violation of the National Wild Scenic Rivers Act, whose intent is to preserve the character of a river. The act does not halt development and use of a river, but it does preserve the character of a river (County of Sacramento, DERA 2009a).

State

The California Wild and Scenic Rivers Act was passed in 1972 to preserve designated rivers possessing extraordinary scenic, recreation, fishery, or wildlife values (County of Sacramento, DERA 2009a). The lower American River, from Nimbus Dam to the confluence with the Sacramento River, is designated as recreation under this act.

The project area is within the Folsom Lake SRA. The SRA's general plan/resource management plan includes goals to protect and enhance views and distinctive landscape features that contribute to the setting, character, and environment of the SRA. The Lake Natoma Bluffs, rising above the western shoreline of Lake Natoma, and the vegetated shoreline of Lake Natoma are considered distinctive landscape features of the SRA and are within the project area (CDPR and Reclamation 2007). The SRA general plan/resource management plan provides guidelines for facilities that are sited within the SRA so as to be sensitive to scenic views into the park and should minimize impacts from key viewpoints (CDPR and Reclamation 2007).

Local

No policies in the Sacramento County General Plan directly relate to the Hatchery. The county has authority over land uses next to Lake Natoma within unincorporated Sacramento County. This is because Lake Natoma is part of the American River Parkway under the 1985 American River Parkway Plan. The county applies, as part of its zoning code, the Parkway Corridor Combining Zone within the parkway to ensure land use compatibility and to reduce visual intrusion on natural amenities. Policies of the Sacramento County General Plan that could be related to the recreational impacts of the proposed project include locating development to minimize visual intrusion in areas of scenic and cultural value, such as the following:

- Recreation and historic areas;
- Scenic highways;
- Landscape corridors;
- State or federal designated wild and scenic rivers;
- Visually prominent locations, such as ridges, designated scenic corridors, and open viewsheds; and
- Native American sacred sites.

3.15 Socioeconomics and Environmental Justice

3.15.1 Socioeconomics

This section is a discussion of the socioeconomic conditions within the region of influence, identified as Sacramento County for socioeconomic analysis. Data for California are presented for comparison and to analyze the possible broader effects of the proposed project. Data for Sacramento County and Rancho Cordova, the nearest city, are presented where available. Socioeconomic conditions are population, housing, employment, schools, environmental justice, and the protection of children.

During the scoping process for this EIS/EIR, the public expressed concerns on various issues. Their specific concerns focused on the continued and expanded access to recreation, public safety, enhanced viewing opportunities, and potential contamination of the American River Trout Hatchery from the New Zealand mud snail as a result of expanded public access.

Population

Table 3-10 presents population figures for Rancho Cordova, Sacramento County, and California from 1990 to 2009. Between 1990 and 2000, the population of Sacramento County increased by 16.9 percent, which is greater than the state's growth rate of 13.8 percent during the same period. Rancho Cordova was not incorporated until 2003. Between 2004 and 2009, its population grew by about 13.0 percent, while growth in Sacramento County was a much lower 6.5 percent, which was greater than the state average of 5.8 percent. Similar to the previous decade, between 2000 and 2009 the population of Sacramento County grew by a greater percentage than that of the state, 17.1 percent and 13.0 percent, respectively. The level of growth in Sacramento County is expected to gradually decrease to below that of the state average by 2040, as shown in Table 3-11. Between 2009 and 2020 and between 2020 and 2030, Sacramento County's growth is projected to be lower than that of the state, whereas, between 2030 and 2040, it would be slightly greater than the percentage growth of the state population. By 2040, Sacramento County's population is expected to rise to 1,989,221 residents, an increase of 38.8 percent from 2009, while the population of California is expected to increase by nearly 41.7 percent, to more than 54 million (Table 3-11).

Table 3-10
Sacramento County Population Estimates (2000-2009)

	1990	2000	1990-2000 Percent Change	2004	2009	2004-2009 Percent Change	2000-2009 Percent Change
Rancho Cordova	NA*	NA*	NA*	54,679	61,817	13.1	NA
Sacramento County	1,046,872	1,223,499	16.9	1,345,646	1,433,187	6.5	17.1
California	29,760,021	33,873,086	13.8	36,199,342	38,292,687	5.8	13.0

Source: California Department of Finance 2009a and 2009c
*Rancho Cordova was not incorporated as a city until July 1, 2003 (City of Rancho Cordova 2009)

Table 3-11
Sacramento County Population Projections (2000-2040)

	2000	2009	2020	2030	2040	2000-2040 Percent Change	2009-2040 Percent Change
Sacramento County	1,223,499	1,433,187	1,622,306	1,803,872	1,989,221	62.6	38.8
California	33,873,086	38,292,687	44,135,923	49,240,891	54,266,115	60.2	41.7

Source: California Department of Finance 2009a, 2009b

Housing

Table 3-12 presents housing estimates for 2000 and 2009 for Sacramento County and California and 2009 data for Rancho Cordova. Between 2000 and 2009, the number of housing units in Sacramento County increased by 16.7 percent (from 474,814 units to 553,916 units), while in California the housing supply increased by 10.8 percent (California Department of Finance 2009b, 2009c). The average number of persons per household has remained the same in Sacramento County, while the vacancy rate decreased slightly between 2000 and 2009. Although the rate of vacancy declined in Sacramento County, the actual number of vacant units increased by 245,176. The statewide average number of persons per household remained stable, and the vacancy rate increased slightly. The vacancy rate in Rancho Cordova is similar to that of Sacramento County, as is the number of persons per household. Both the vacancy rate and the number of persons per household in Sacramento County and Rancho Cordova were lower than the state average, which indicates that the housing stock would be less capable of absorbing growth than would other areas.

Table 3-12
Sacramento County Housing Estimates (2000 and 2009)

	2000			2009		
	Housing Units*	**Vacancy Rate (%)**	**Persons per Household**	**Housing Units**	**Vacancy Rate (%)**	**Persons per Household**
Rancho Cordova	NA**	NA**	NA**	24,463	4.4	2.6
Sacramento County	474,814	4.5	2.6	553,916	4.3	2.6
California	12,214,550	5.8	2.9	13,530,719	5.9	2.9

Sources: California Department of Finance 2009b, 2009c
*Housing Units includes both single and multiple family housing
**Rancho Cordova was not incorporated as a city until July 1, 2003, thus no housing data is available (City of Rancho Cordova 2009)

Employment and Income

Table 3-13 provides basic data on employment in Rancho Cordova, Sacramento County, and California. On average, 640,800 Sacramento County residents were employed in 2008, or about 92.8 percent of the labor force. The county's unemployment rate of 7.2 percent was the same as the state average and below the average for Rancho Cordova. However, by November 2009, unemployment in Sacramento County had reached 10.4 percent, while the state average had climbed to 12.3 percent. Rancho Cordova's unemployment rate was 14.2 percent for November 2009.

Table 3-13
Employment Statistics (2008)

	Rancho Cordova	Sacramento County	California
Employed	28,600	640,800	17,059,600
Unemployed	2,600	49,600	1,332,300
Unemployment Rate (%)	8.3	7.2	7.2

Sources: California Employment Development Department 2009a, 2009b

Table 3-14 provides a breakdown of current employment by industry in Sacramento County. The most current data available for the county alone is the annual average for 2008. In 2008 the category with the largest number of jobs was the government sector, followed by the trade, transportation, and utilities sector, and then professional and business services. In the Metropolitan Statistical Area in November 2009, the greatest

Table 3-14
Employment in Sacramento County (2008)

Industry Type	Employment	Percent of Total Employment
Total farm	2,900	0.5
Mining and logging	100	0.0
Construction	34,300	5.4
Manufacturing	23,000	3.6
Trade, transportation, and utilities	90,400	14.1
Information	14,900	2.3
Financial activities	39,900	6.2
Professional and business services	80,300	12.5
Educational and health services	70,000	10.9
Leisure and hospitality	52,300	8.2
Other services	19,500	3.0
Government	171,700	26.8

Source: California Employment Development Department 2009d

employment was in the government sector, followed by the trade, transportation, and utilities sector, and then educational and health services (California Employment Development Department 2009c).

3.15.2 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. It requires federal agencies to identify and avoid disproportionate impacts on minority or low-income communities. This section identifies minority or low-income populations that could be affected by the proposed project.

Table 3-15 provides demographic information for Sacramento County from 2000 to 2008. According to the US Census Bureau data, the Asian population was the largest minority in both 2000 and 2008, and the Black population was the second largest minority. Between 2000 and 2008 all minority populations increased, except for the American Indian/Alaska Native group. However, the 2000 census included the option to report oneself as a member of two or more ethnic groups, and this factor may affect the

Table 3-15
Demographic Changes in Sacramento County (1990-2008)

	2000	2008	Percentage (2000)	Percentage (2008)	Percent Change 2000-2008
Total population	1,223,499	1,380,708	-	-	12.8
White	783,240	851,743	64.0	61.7	8.7
Black/African American	121,804	138,359	10.0	10.0	13.6
American Indian/Alaska Native	13,359	12,387	1.1	0.9	-7.2
Asian	139,899	186,116	11.0	13.5	33.0
Pacific Islander	7,264	11,480	0.6	0.8	58.0
Two or more	71,392	59,868	5.8	4.3	-16.1
Hispanic/Latino*	195,890	273,759	16.0	19.8	39.7

Source: US Census Bureau 2000a, 2008a

* In combination with other races. The categorical figures/percentages may add up to more than the total population (100 percent) because individuals may report more than one race.

reporting for certain ethnic groups (US Census Bureau 2000a, 2008a). In both 2000 and 2008, Hispanics formed the largest ethnic minority. Between 2000 and 2008, Hispanics increased by approximately 40 percent, and American Indian/Alaska Native population decreased by approximately 7 percent.

The 2000 US Census provides the most recent data available for race and ethnicity (Table 3-16) for Rancho Cordova. As of 2000, Rancho Cordova's ethnic diversity was similar to that of Sacramento County. Approximately 33.3 percent of Rancho Cordova was composed of minorities, as compared to 36.0 percent of Sacramento County. Similar to Sacramento County, the Asian or Black/African American group formed the largest racial minority. The percentage of Hispanic or Latino residents was lower in Rancho Cordova than in Sacramento County in 2000 (US Census Bureau 2000b).

Table 3-17 provides income and poverty statistics for Rancho Cordova, Sacramento County, and California. The median household income in Sacramento County is lower than that of California, and the poverty rate is 0.3 percent lower. The median household income in Rancho Cordova is lower than that of Sacramento County by 11.7 percent, and the percentage of the population living in poverty is higher (US Census Bureau 2008b).

Table 3-16
Rancho Cordova Demographics (2000)

Ethnicity	Population	Percentage
Total	55,060	-
White	36,704	66.7
Black/African American	6,245	11.3
American Indian and Alaska Native	521	0.9
Asian	4,537	8.2
Pacific Islander	300	0.5
Two or more races	3,602	6.5
Hispanic or Latino	7,100	12.9

Source: US Census Bureau 2000b

Table 3-17
Income and Poverty Statistics (2008)

	City of Rancho Cordova	Sacramento County	California
Median household income	51,020	57,779	61,154
Percentage of population living in poverty	16.5	12.6	12.9

Source: US Census Bureau 2008a, 2008b

Schools and the Protection of Children

In April 1997, President Clinton signed EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. This EO requires federal agencies to identify, assess, and address disproportionate environmental health and safety risks to children from federal actions. This section identifies schools and residential areas with children near the project area.

There are 22 school districts in Sacramento County with 399 schools and 238,048 students. The districts closest to the proposed project are the Folsom-Cordova Unified School District, which provides K-12 education for 19,029 students in 35 schools, and the San Juan Unified School District, which provides K-12 education for 47,400 students in 81 schools (NCES 2009). Although several schools are near the project area, the closest are La Bella Learning Centers LLC (approximately 0.95 mile away); Earl Legette Elementary School (approximately 1.3 miles away), which provides grades K-6 for 504 students; Gold River Discovery Center (approximately 1.3 miles away), which provides grades K-8 for 657 students; and Natoma Station Elementary School (approximately 2.6 miles away), which provides grades K-6 for 589 students. None of these schools are next to or across the street from the project area (Google 2009; Education Data Partnership 2009).

The project area is surrounded by recreational access to the American River, where children could be present and may patronize recreation facilities in the area.

4. Environmental Consequences

The environmental consequences section of this EIS/EIR was prepared in accordance with NEPA and the CEQ regulations and guidelines and with CEQA and the CEQA Guidelines.

This section provides an analysis of the potential adverse and beneficial environmental impacts that could result from implementing Alternative 1A, Alternative 1C, or Alternative 2, compared to the No Action Alternative. The resource categories listed in Chapter 3 are discussed in the same order in the sections that follow.

Direct, indirect, and cumulative impacts are analyzed for each resource. Direct impacts are caused by the proposed action and occur at the same time and place as the proposed action. Indirect impacts are reasonably foreseeable impacts caused by the proposed action that occur later in time or that are farther removed in distance. Examples of indirect impacts are growth-inducing effects and ecosystem impacts. Cumulative impacts result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time.

Significance criteria are presented at the beginning of each resource section. The significance criteria are used to assess the severity of the environmental impacts of the proposed action. NEPA does not proscribe specific significance criteria but rather states that the environmental impacts should be evaluated in terms of their context, intensity, and duration. The CEQA Environmental Checklist does proscribe specific significance criteria for common resource categories. The significance criteria presented here are a combination of those defined in the CEQA Environmental Checklist and others that help to provide a benchmark for the context, intensity, and duration of the environmental impacts.

The environmental impacts are classified as negligible, less than significant, or significant, which are defined as follows:

- A significant impact would cause a substantial adverse change in the environment that would exceed the defined significance criteria;

- A less than significant impact would cause an adverse change in the environment that does not meet or exceed the defined significance criteria; and

- A negligible impact would cause a slight adverse change in the environment, but one that generally would not be noticeable.

Impacts may also be beneficial, meaning the change in the environment would generally be regarded as an improvement over current conditions.

The impacts from continuation of the current level of public access to Nimbus Shoals are discussed under each alternative. The impacts of altering public access to Nimbus Shoals are evaluated at the programmatic level. Three alternatives to current public access are being considered: public vehicle access with a defined parking area, walk-in only access (no public vehicle access), and no public access. The impacts of the three visitor management scenarios for Nimbus Shoals are discussed under Alternatives 1A and 2. The impacts of the visitor management alternatives are not specifically discussed under Alternative 1C, as they are similar or slightly reduced compared to Alternative 1A because the Shoals would likely receive fewer visitors due to the fishing closure. Any of the three visitor management alternatives could also be implemented under Alternative 1C. At this time, Reclamation has not identified a preferred visitor management option. As the analysis in this EIS/EIR for the visitor management options is at a programmatic level, additional analysis would be conducted as necessary to comply with NEPA before implementing specific activities under the selected option.

For all impacts that are identified as significant and where mitigation is possible and feasible, appropriate mitigation measures are identified to reduce the impacts to a less than significant level. Mitigation measures in this EIS/EIR are formulated consistent with CEQ NEPA regulations, Section 1508.20, and the CEQA Guidelines Section 15370.

Reclamation will develop an environmental compliance monitoring program to ensure that the mitigation measures for the selected alternative are implemented in an appropriate and timely manner.

4.1 Fisheries

This section describes the potential impacts on the fishery resources in the project area from implementing the alternatives identified in Chapter 2. Impacts are considered significant if they were to result in a permanent loss of habitat, to the extent that a population of a given species were lost or degraded so that the species became considered for listing or attained a higher level of listing.

Impacts also are considered significant if they were to result in any of the following:

- Substantial loss or degradation of habitat;
- Fragmentation or isolation of habitat;
- Take of a listed species, which includes harassment, death, disruption of breeding or feeding cycle;
- Violations of the Magnuson-Stevens Fishery Conservation Act, the MBTA, ESA, or the CESA;
- Change in conditions affecting the movement of any resident or migratory fish species and other aquatic species;
- Reduction in local population size attributable to direct mortality or habitat loss, lowered reproductive success, or habitat fragmentation of special-status species, especially those that are state or federally listed or that are proposed for listing as threatened or endangered, portions of local populations that are candidates for state or federal listing and federal and state species of concern, or species that qualify as rare and endangered under CEQA;
- Adverse effects on fish communities or species protected by applicable environmental plans and goals, such as species conservation and recovery plans;
- Change in the abundance, geographic range, or seasonal timing of any species' life stage; or
- Substantial reduction or elimination of species diversity or abundance.

4.1.1 Alternative 1A

Under Alternative 1A, there would be impacts on the fisheries in the project area during construction and the operation of the new passageway, from removing the weir, and from increased sportfishing pressures.

Construction of the new fish passageway would involve closing an area of the stilling basin and dewatering for construction for the installation of the rock channel section. A rock access berm with a plastic liner would be used to dewater the site for constructing the entrance to the fish channel. This area would be closed and dewatered from June to September to minimize the potential impacts on steelhead and salmon in the area. This dewatered area would be limited to approximately 0.2 acre, which is approximately three percent of the entire stilling basin. During construction, this dewatered area would no longer be available as habitat for area fish. Construction of the berm or installation of the sheet pile used in dewatering an area could result in fish becoming trapped within the dewatered area. This in turn could kill some of the species trapped within the area. A fish salvage and rescue plan would be implemented as a mitigation measure to minimize this potential adverse impact. This plan would detail the methods to return trapped fish to the open portion of the American River. In addition, during dewatering activities, low-flow pumps with screened intakes would be used to minimize fish injury and mortality. Due to the small size of the dewatered area, the short time frame of its construction, the fact the construction would take place during a nonsensitive time of the year for the species in the stilling basin, and that direct take would be minimized with implementation of the above mitigation measures, impacts from dewatering activities would be less than significant.

During construction, there would be an increased potential for water quality degradation due to disturbance of river sediments and silt runoff from disturbed areas. Water quality degradation would lower habitat quality in the area. BMPs, such as turbidity curtains, silt fences, or straw bales for erosion control, would be implemented to minimize potential river siltation. Construction of the new fish passageway and its components (rock channel section, ladder section, and flume section) would involve the removal of vegetation and the use of heavy equipment. This would likely result in some amount of erosion and potential sedimentation of the stilling basin or the American River. BMPs would be implemented to minimize erosion and sedimentation, and impacts would be less than significant.

Vegetation that is directly alongside the water can also provide shading that lowers the water temperature. Removing any of this vegetation would increase water temperatures. Currently, water temperatures are sufficient to maintain salmon and steelhead spawning in the project area. This impact would likely be negligible due to the small amount of vegetation that would be removed in the path of the new passageway. Environmental Commitments BIO-7, BIO-8, BIO-14, and BIO-15 (Appendix C) would minimize impacts to vegetation and the impact to spawning habitat from vegetation disturbance and removal.

Removing the weir would require lowering river flows during construction. This lowering of river flows would have a short-term less than significant impact because the in-river work would only occur from June through September, when fish are not spawning, and spawning habitat would not be impacted. The process would include removing the piers, removing all sheet pile, wire, and rebar in the foundation and surrounding river bottom, and removing and redistributing the large angular rock and cobble in the foundation to the finished grade of the river. Modeling has shown that after the weir is removed, no riffle is anticipated to exist. The portion of the lower American River within the project area (up to Nimbus Dam) is EFH for the fall-run chinook salmon for spawning and rearing. Although the rock and cobble below the riffle is too large to provide spawning habitat, the loss of this riffle may result in loss of juvenile rearing habitat; however, no juvenile rearing has been documented here (Robinson 2010). This impact would be less than significant because removing the weir opens the habitat from the weir to the Nimbus Dam for use by all fish species, not just those that are able to bypass the weir. Removing this weir and operating the new fish passageway would have a beneficial impact on all fish species in the lower American River by eliminating the need to reduce the river flow during weir installation and repair. Eliminating the need to reduce river flows to install, remove, and repair the weir would also have the beneficial impact of increasing operational flexibility.

Impacts on the fisheries would occur after construction is complete. Because the new passageway would be placed in a highly visited area and the existence of the new passageway could increase visitation to the Nimbus Shoals area, there could be an increase in the amount of trash and litter in the area. This could degrade the fishery habitat in the area. Because the number of people in the area would increase and the entire Nimbus Shoals area would remain open to vehicle traffic, there would also likely be an increase in erosion and sedimentation. As described above, this would degrade the water quality and fish habitat; impacts would be less than significant.

Removing the weir would allow all spawning fish to enter the Nimbus Dam stilling basin, instead of being directed into the Hatchery at the weir. With the increase in fish densities in the stilling basin, angler success rates are expected to increase, along with the number of anglers using the area, resulting in increased sportfishing pressures on chinook salmon and steelhead in the area. Chinook salmon and steelhead are protected under both the federal and state ESAs; therefore, a significant adverse effect could occur under Alternative 1A as these protected species would be highly vulnerable to sport fishing harvest under the existing fishing regulations, especially during spawning time in the area of the stilling basin. This impact could be mitigated to less than significant by closing public access to Nimbus Shoals.

Additionally, anglers in the area often use lead sinkers, which often become detached from the line and sink to the bottom. Allowing fishing to continue will allow lead sinkers to continue to accumulate.

Continued sport fishing in the area would also result in the potential for increased spread of the NZMS. This invasive species has been identified in the lower American River (CDFG 2008a, 2010). This species of snail is known to spread by attaching itself to the wading boots of anglers and on fishing gear and then detaching itself in new areas. If the NZMS were accidentally transported to Lake Natoma, upstream of Nimbus Dam, it would contaminate a portion of the water supply.

Infestation of the American River Hatchery, next to the Nimbus Hatchery, is another concern. Although the American River Hatchery employs strict biosecuirty measures, infestation is a possibility. If it were to become infested, the CDFG would have to find a way to completely disinfect it or would move it to a new location to prevent the spread of the NZMS. Because trout from this hatchery are used to stock areas that do not contain the NZMS, the CDFG would not be able to stock trout until the issue was resolved, which would impact the trout hatchery program across the state. Infestation of the Nimbus Hatchery is a lesser concern because fish entering and exiting the Nimbus Hatchery are returning to anadromous waters in areas where evidence of NZMS has already been found.

While fishing and harvesting would be illegal in the rock-lined channel and fish ladder portion of the passageway, ready access to these areas could result in illegal take. If fish are taken from these areas and sportfishing levels increase in the project area, the Hatchery may be hampered in meeting its annual production goals for the steelhead and fall-run chinook salmon.

The viewing plaza at the Hatchery could have a beneficial impact if visitors were educated by Hatchery personnel on the work that occurs at the Hatchery and in ways to aid in the recovery of area fish.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Public vehicle access with defined parking at Nimbus Shoals would reduce impacts on fisheries in the project area. Limiting vehicles to a defined area would lessen impacts on water quality from erosion and sedimentation, vehicle oil, grease, and fuels; however, a significant adverse impact could still occur from increased sportfishing pressures on chinook salmon and steelhead in the area.

Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.

Walk-in Only (No Public Vehicle) Access

Impacts on fisheries under the walk-in only (no public vehicles) option are the same as those described for the public vehicle access with defined parking option, but to a lesser degree due to the decrease in vehicle presence. In addition, the increased sportfishing pressure on chinook salmon and steelhead could be less under this option because fisher use may decrease somewhat with vehicle access restricted.

No Public Access

This option would protect fisheries from sport harvest, and impacts as described under Alternative 1A would be mitigated to less than significant. Eliminating public access would essentially eliminate erosion and water quality degradation from visitor use and would greatly reduce the amount of trash and litter in the area that could end up in the water and degrade fish habitat. Eliminating most fishing in the area, by restricting public access, would also have the direct benefit of reducing lead sinker accumulation. This would protect the habitat for the fisheries in the project area by limiting the amount of contaminants introduced into the water.

4.1.2 Alternative 1C

The impacts on the fishery resources in the project area are similar to those discussed under Alternative 1A. Impacts from construction are the same as those discussed under Alternative 1A. The only difference between the two would occur from the more restrictive fishing regulations.

By completely eliminating fishing in the area between the USGS gaging cable and the Nimbus Dam, there would likely be less visitation to the Nimbus Shoals by recreational anglers, resulting in potential beneficial impacts on fisheries. Reducing the human activity and vehicle use in this area would reduce the potential for erosion and sedimentation of the water, thereby protecting the habitat for the fish species. The Nimbus Shoals would not be closed to public use, so erosion and sedimentation would not be completely eliminated. Eliminating fishing in the area would also reduce the amount of trash and litter in the area that could end up in the water and degrade fish habitat.

Eliminating fishing in the area would protect sensitive fish species at critical life stages, likely increasing the number of fish that rear and spawn in the stilling basin. By increasing the overall abundance of fish in the area, the Hatchery would be more likely to meet its production goals, which would be a beneficial impact.

While no fishing would be legal in the project area, some illegal fishing or harvesting could still occur, so there would be some adverse impacts on the fish species in these areas, but those impacts would likely be less than significant. Eliminating most fishing in the area would also have the direct benefit of reducing lead sinker accumulation. This would protect the habitat for the fisheries in the project area by limiting the amount of contaminants introduced into the water.

Eliminating fishing from Nimbus Dam downstream to the USGS gaging cable would also have the beneficial impact of aiding in limiting the spread of the invasive NZMS. This is because NZMS often attach to anglers' boots or fishing gear to move from one location to another. This is particularly important because if the NZMS were to spread to Lake Natoma, it would contaminate a portion of the water supply.

4.1.3 Alternative 2

Under Alternative 2, the new weir would be constructed over two years. The first year work would take place on the south half of the river for the construction of the bypass bays, fish ladder entrance, and a portion of the new diversion weir. Construction on the north side of the river would be completed during the second year. To allow for this construction, a cofferdam would be erected in the construction area and the site would be dewatered. A portion of the existing weir would also be removed at this time to allow for construction. All in-river work would be limited to June through September, when no steelhead or chinook are spawning, which would minimize impacts on these species. Dewatering could degrade the habitat quality downriver. Pumped out water could contain high levels of sediment, which, if released directly down river, would increase the sediment load. Water removed from within the cofferdam would be placed in a sedimentation tank to allow the soil to settle out. Then the clean water would be released back into the river. This would result in a less than significant impact.

Removing the weir would have similar impacts on fisheries to those discussed under Alternative 1A. Operating the new diversion weir would have beneficial impacts on the fishery resources in the project area. All components of the new weir would be in place year-round. This would negate the need to reduce river flows to install the weir, as currently happens. Lowering flows can degrade habitat by raising temperatures, increasing turbidity, and otherwise altering habitat conditions, so eliminating this would benefit species downriver. Lessening the need to reduce river flows to install, remove, and repair the weir would also have the beneficial impact of increasing operational flexibility.

Additionally, the new weir would be built to withstand flows of up to 160,000 cfs, which would further reduce the need for major repairs. However, because the new weir would contain more moving parts, maintenance and repair costs would increase, and if any significant damage does occur, the duration of flow reductions during repairs would likely be longer. The extent of the impacts from flow reductions, as described above, would depend on the amount of time required to make the repairs, as well as the time of year when repairs are made.

The new weir would be composed of four entrances to the fish ladder to direct the fish into the Hatchery. These entrances would be in operation from early September through late December each year, which is similar to current operations. The addition of new entrances to the Hatchery and the construction of the new weir would aid the hatchery in ensuring that they reach the production goals for each species annually. Although the Hatchery would take only as many fish as required to reach production goals, the new weir would be fish-tight; adult fish would not be able to bypass the weir and continue upstream to the stilling basin.

The new weir would also contain a denil fish ladder designed to allow juvenile salmonids that are not spawning to bypass the entrance to the Hatchery and continue up to the Nimbus stilling basin. The denil ladder would operate only when the weir was active and directing fish into the Hatchery. It would be designed to exclude adult salmonids. The operation of this denil ladder would have a beneficial impact on juveniles by eliminating the stress of entering the Hatchery.

Because the new weir would likely decrease the number of adult fish passing up to the stilling basin, there would likely be less sportfishing harvest. Reducing this harvest would have a beneficial impact by reducing mortality and supporting the Hatchery's mission. Additionally, if there were less success in sportfishing in the project area, the number of visitors to the Nimbus Shoals region could decrease over time. If there were fewer people visiting the area, there would be less disturbed vegetation, erosion, sedimentation, and littering likely, which would improve fish habitat.

Under Alternative 2, the NZMS would likely continue to spread as fishing would continue to be allowed in accordance with current regulations. Because the NZMS spreads primarily by attaching to waders or angling equipment, having fewer people in the area due to decreased fishing opportunities could decrease the spread of this invasive species; however, the spread would continue, albeit at a slower pace. Impacts from the spread of the NZMS are the same as those under Alternative 1A.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Public vehicle access with defined parking at Nimbus Shoals would reduce impacts on fisheries in the project area. Limiting vehicles to a defined area would lessen impacts on water quality from erosion and sedimentation, vehicle oil, grease, and fuels. With the addition this option, impacts under Alternative 2 would remain less than significant.

Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.

Walk-in Only (No Public Vehicle) Access

Impacts on fisheries under the walk-in only (no public vehicles) option are the same as those described for the public vehicle access with defined parking option, but to a lesser degree due to the decrease in vehicle presence. With the addition of this option, impacts from implementing Alternative 2 would remain less than significant.

No Public Access

Eliminating public access would essentially eliminate erosion and water quality degradation from visitor use and would greatly reduce the amount of trash and litter in the area that could end up in the water and degrade fish habitat. Eliminating most fishing in the area, by restricting public access, would also have the direct benefit of reducing lead sinker accumulation. This would protect the habitat for the fisheries in the project area by limiting the amount of contaminants introduced into the water. With the addition of this option, impacts from implementing Alternative 2 would remain less than significant.

4.1.4 No Action Alternative

The No Action Alternative would keep the existing weir, and no new fish passageway would be constructed. No new major construction would take place, and fishing regulations would remain the same.

Under this alternative, the fish weir would continue to be used, short duration flow reductions to install and remove the weir each year would continue, and extended flow reductions to perform major repairs after significant flooding would continue. Significant flooding occurs approximately once every ten years. Major repairs require the lowering of water flows to allow in-river construction. Reducing water flow results in less than significant impacts on fisheries because most flow reductions would last less than one day. However, during significant floods, repairs to the weir may take several days or require reduced flows.

Operation of the current weir allows a small number of steelhead and chinook salmon to bypass the Hatchery entrance and to spawn upstream. This lowers the effectiveness of the Hatchery to meet its annual production goals. This impact is less than significant because only a small number of fish do not enter the Hatchery.

In the Nimbus Shoals area, visitors would continue to be allowed unimpeded access, and impacts from recreational use such as vegetation disturbance, erosion, and water quality degradation would continue. There would be no new impacts.

As the population rises, more fishing may occur in the project area. This would result in more take of listed species. Also, as there are more anglers in the area, there would be more lead sinker accumulation; the current rate of lead accumulation is not deemed to have a significant impact on the fish in the area. Additionally, snagging, an illegal fishing technique, would likely increase as the number of anglers increased in the area.

The NZMS would continue to spread under this alternative as fishing would continue to be allowed in the project area, in accordance with current regulations. Impacts from the spread of the NZMS are the same as those under Alternative 1A.

4.2 Biological Resources

The region of influence for biological resources includes the project area and a surrounding 250-foot buffer area of contiguous habitats that could be affected by the proposed activities. This buffer is included to account for mobile wildlife and bird species, noise disturbance, and indirect impacts on vegetation and habitat.

Impacts would be significant if they were to result in permanent loss of habitat to the extent that a population of a given wildlife species were lost or degraded so that that species became considered for listing under the federal or state ESA or attained other status as a species of concern.

Impacts would also be considered significant if they were to result in any of the following:

- Substantial loss or degradation of a plant community and associated wildlife habitat;
- Fragmentation or isolation of wildlife habitats, especially riparian and wetland communities;
- Long-term loss or degradation of a sensitive plant community because of substantial alteration of landform or site conditions (e.g., alteration of wetland hydrology);
- Take of listed species, which includes harassment, death, disruption of breeding or feeding cycle, or loss of active nests;
- Substantial disturbance or displacement of wildlife resulting from human activities;
- Disruption of natural wildlife movement corridors;
- Avoidance by animals of biologically important habitat for substantial periods; such avoidance may increase mortality or reduce reproductive success;
- Violations of the MBTA or federal or state ESAs;
- Reduction in local population size attributable to direct mortality or habitat loss, lowered reproductive success, or habitat fragmentation of special status species, especially those that are state or federally listed or proposed for listing as threatened or endangered, portions of local populations that are candidates for state or federal listing and state species of concern, or species that qualify as rare and endangered under CEQA;

- Change in the abundance, geographic range, or seasonal timing of any species life stage; or
- Substantial reduction or elimination of species diversity or abundance.

4.2.1 Alternative 1A

Vegetation Communities

Under Alternative 1A, all five of the vegetation communities in the project area could be temporarily or permanently affected by construction (Table 4-1).

Table 4-1. Acreage of Vegetation Types Temporarily or Permanently Affected by Construction under Alternative 1A

	Area Directly Affected (acres)	
Vegetation Type	**Temporary**	**Permanent**
Riparian forest/scrub	1.59	0.66
Oak woodland	0.17	0.04
Annual grassland/ruderal	1.67	0.41

Temporary direct effects would be from clearing for staging or trampling by workers or heavy machinery. Longer-term direct effects would result from permanent vegetation removal where the fish passageway would be located, and indirect effects would be from the potential introduction or spread of invasive plant species. Where temporary effects occur, these areas would be revegetated and restored to comply with permitting requirements. These requirements would be determined during the consultation process for permits and during the Section 7 ESA consultation process. Further, construction practices, such as BIO-1 and BIO-6 (Appendix C) would minimize the chance that invasive species would be introduced by implementing a worker environmental training program, using weed-free mixes for revegetation, and washing equipment. Environmental Commitments BIO-3, BIO-14, BIO-15, BIO-16, and BIO-17 would further reduce impacts on vegetation by using a biological monitor, replacing vegetation, preserving and protecting vegetation, and repairing injured vegetation. Compliance with permitting requirements and implementing environmental commitments would ensure less than significant project impacts.

Permanent direct impacts would occur primarily on riparian forest/scrub and annual grassland/ruderal vegetation (Table 4-1). Given the small acreage that would be permanently affected and the abundance of similar vegetation in adjacent areas, impacts are expected to be less than significant.

Impacts would continue to occur from recreationists, such as direct effects from plant removal and mechanical damage to plants. Indirect effects of recreation are soil compaction, erosion, sedimentation, habitat alteration, and weed introduction and spread. However, under this alternative, more fish would congregate near the Nimbus Shoals area, making it more attractive for anglers. The potential increase in recreationists, particularly anglers, and vehicle use on the Nimbus Shoals would increase the impacts on vegetation in areas where fishing is allowed. Impacts from humans would be reduced in the area near the fish passageway entrance where fishing would be prohibited. The magnitude of impacts would vary depending on the number of increased users.

Wildlife

Wildlife habitat would be disrupted during the construction phases due to increased noise, human presence, vegetation removal, and soil disturbance. These indirect impacts would be temporary, and all habitats except previously disturbed communities would be recontoured and revegetated to their original condition after construction is completed. Construction practices, such as BIO-3, BIO-4, BIO-5, BIO-8, BIO-9, BIO-11, BIO-12 (Appendix C), would have a biological monitor on-site, would limit construction to designation construction and staging use areas, would implement environmental timeframes to avoid migratory and raptor nesting periods, and would protect woody riparian and oak woodland vegetation. These measures would minimize impacts to less than significant.

Impacts would continue to occur from recreationists, such as direct mortality of wildlife from such events as vehicle collisions, or indirect alteration of habitat conditions. The potential increase in recreationists, particularly anglers and those operating vehicles on Nimbus Shoals, could increase impacts on wildlife in areas where fishing is allowed. Impacts from humans would be reduced in the area near the fish passageway entrance, where fishing would be prohibited. The magnitude of impacts would vary, depending on the number of increased users.

Wetlands and Sensitive Habitats

The fish passageway and construction zones have been sited to avoid wetlands as much as possible. Approximately 0.1 acre of wetland will be permanently impacted by construction of the fish passageway. Approximately one acre of "other waters" will be temporarily impacted. Impact mitigation would be determined during the consultation process for CWA Section 404 and401 and CDFG Section 1602 permits. In addition, environmental commitments, such as BIO-2, BIO-3, and BIO-7 (Appendix C) would mark wetlands, would require the use of a biological monitor, and would develop a mitigation plan, as required. Impacts would be less than significant.

Direct impacts would continue to occur from recreationists, such as by humans and vehicles trampling vegetation or polluting wetlands with litter and dumping. The potential increase in recreationists, particularly anglers and vehicle operators on Nimbus Shoals, could increase impacts on wetlands in areas where fishing is allowed. Impacts from humans would be reduced in the area near the fish passageway entrance where fishing would be prohibited. The magnitude of impacts would vary, depending on the number of increased users.

Oak woodland and riparian habitats would be temporarily or permanently affected by Alternative 1A. Implementing Environmental Commitments BIO-2, BIO-3, BIO-8, and BIO-9 (Appendix C) would ensure less than significant project impacts by marking sensitive habitats, requiring the use of a biological monitor, and protecting woody riparian vegetation and oak woodlands.

Special Status Species

Impacts on special status species would continue to occur from recreationists, such as direct mortality of wildlife from such events as vehicle collisions, trampling of special status plants, or indirect alteration of habitat conditions. The potential increase in recreationists, particularly angers and vehicle operators on Nimbus Shoals, could increase impacts on special status species in areas where fishing is allowed. Impacts from humans would be reduced in the area near the fish passageway entrance, where fishing would be prohibited. The magnitude of impacts would vary, depending on the number of increased users.

Valley elderberry longhorn beetle. Construction would require the removal of elderberry shrubs, the host plant for the threatened valley elderberry longhorn beetle. In addition, some project activities would be within the 100-foot construction buffer zone required by the USFWS for shrubs one inch in diameter or greater. Although Reclamation would avoid as many elderberry shrubs as possible when it defines the final alignment of the fish ladder, it would not be possible to avoid all the elderberry shrubs. One shrub, H25, would be affected by construction; it would be transplanted out of the direct impact zone. All adverse effects on elderberry shrubs would be fully compensated as required through Section 7 consultation and in accordance with USFWS protocols. As a result, effects on the valley elderberry longhorn beetle would be less than significant.

Reclamation would place fencing around all other shrubs near the construction zone at a distance of 30 feet from the shrubs to protect them. Although the buffer fence around shrubs H08, H13, and H21 would overlap the construction direct impact zone, a survey conducted in July 2010 by Reclamation and USFWS indicated that the construction would likely be able to proceed without impacting the shrubs. These shrubs would be difficult to transplant because they are old and on a steep embankment. Reclamation has assumed a large construction direct impact zone to account for potential sloughing of adjacent soils. These elderberry shrubs are closely associated with soils of the Mehrten Formation, which are hard and do not slough. For these reasons, these shrubs would not likely be affected.

Valley sagittaria. Construction would have short-term temporary and long-term permanent indirect less than significant impacts on this species due to habitat disturbance and loss. Short-term disturbance to potential habitat would be reduced by revegetating and restoring it to its preconstruction condition. Reclamation would implement the following mitigation measure to ensure less than significant project impacts:

> Before construction begins and during the flowering season (May through October), a qualified biologist would conduct a survey for valley sagittaria in all areas where permanent impacts would occur. If the species were

found, Reclamation would consult with the CDFG to determine appropriate mitigation.

Swainson's hawk and other sensitive raptor species. Construction would have short-term indirect impacts on these species due to increased noise and human presence. This may deter some species from using the project area during construction, although similar suitable habitat can be found near the project area and along the American River. Some potential habitat would be permanently removed, but this is unlikely to prevent bird use of the project area once construction is complete. With implementation of Environmental Commitment BIO-12 (Appendix C), project impacts would be less than significant.

Bank swallow. Construction would have short-term direct impacts on this species due to bank habitat disturbance. Noise and human impacts related to construction would also be short term and direct. All impacted potential bank swallow habitat would be restored to its preconstruction condition. With implementation of Environmental Commitment BIO-11 (Appendix C), project impacts would be less than significant.

Northwestern pond turtle. Construction would have short-term indirect impacts on this species due to increased noise, human presence, and disturbance of potential basking habitat. Work in the water could cause temporary and localized turbidity and increase suspended sediment in the water column. Temporary impacts on habitat would be reduced through revegetation and restoration. Further, once construction begins, noise disturbance would cause northwestern pond turtles to avoid the construction area and to use adjacent habitats. Environmental Commitments BIO-1, BIO-2, BIO-3, and BIO-4 would be implemented to ensure less than significant project impacts.

Tricolored blackbird and other migratory bird species. Construction would have short-term indirect impacts on these species due to increased noise and human presence. This may deter some species from using the project area during construction, although similar suitable habitat can be found near the project area and along the American River. Some potential habitat would be permanently removed, but this is unlikely to prevent bird use of the project area once construction is complete. Implementing Environmental Commitment BIO-11 (Appendix C) would further minimize impacts. Impacts would be less than significant.

Silver-haired bat. Construction would have short-term indirect impacts on this species due to increased noise, human presence, and disturbance of roosting and foraging sites. This may deter the silver-haired bat from using the project area during construction, although similar suitable habitat can be found near the project area and along the American River. Some potential habitat would be permanently removed, but this is unlikely to prevent bat use of the project area once construction is complete. Due to the short-term nature of impacts and the presence of suitable adjacent habitat, impacts would be less than significant.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Public vehicle access with defined parking at Nimbus Shoals would reduce impacts from vehicles. There would be fewer impacts on vegetation, wetlands, and sensitive habitats, such as trampling and erosion, as well as on wildlife and special status species, such as mortality caused by vehicle collisions. With the addition this option, impacts from implementing Alternative 1A would remain less than significant.

Walk-in Only (No Public Vehicle) Access

Impacts on biological resources under the walk-in only (no public vehicles) option are the same as those described for the public vehicle access with defined parking option, but to a lesser degree due to the decrease in vehicle presence. With the addition of this option, impacts from implementing Alternative 1A would remain less than significant.

No Public Access

Eliminating public access would essentially eliminate the impacts on biological resources described above that result from visitor use. This would have a beneficial impact on vegetation and wildlife. With the addition of this option, impacts from implementing Alternative 1A would remain less than significant.

4.2.2 Alternative 1C

Temporary and permanent impacts on vegetation, wildlife, wetlands and sensitive habitats, and special status species from construction under Alternative 1C are the same as those described above for Alternative 1A.

Operational impacts also would be the same; however, fishing closures under Alternative 1C could reduce the number of recreationists at Nimbus Shoals. This would greatly reduce impacts, such as those described above, caused by recreationists. As a result, impacts from Alternative 1C would be less than significant.

4.2.3 Alternative 2

Vegetation Communities

Alternative 2 would temporarily affect approximately 1.2 acres of annual grassland habitat during construction. Temporary direct effects include clearing for staging or trampling by workers or heavy machinery. Where temporary effects occur, these areas would be revegetated and restored to comply with permitting requirements. These requirements would be determined during the consultation process for permits and during the Section 7 ESA consultation process. Further, construction practices (described above under Alternative 1A and in Appendix C, Environmental Commitments) would minimize the chance that invasive species would be introduced by implementing a worker environmental training program, using weed-free mixes for revegetation, and washing equipment. Compliance with permitting requirements and implementing environmental commitments would ensure less than significant project impacts.

Impacts on vegetation from recreational use of Nimbus Shoals may decrease due to there being fewer users of the Shoals. This is because the fish-tight replacement weir would block more adult fish than the existing weir, reducing fishing opportunities.

Wildlife

Wildlife habitat would be disrupted during construction due to increased noise, human presence, vegetation removal, and soil disturbance. Construction would permanently affect open water habitat in an area 750 feet long and 52 feet wide across the river. Open water habitat immediately upstream and downstream of the proposed weir, as well as annual grassland habitat along the south bank of the river, would be temporarily affected by weir construction. Annual grassland habitat would be recontoured and revegetated to its original condition after construction. Construction could temporarily disturb raptors wintering and foraging in the area and would temporarily reduce the amount of open water habitat used by wildlife for foraging; however, it would not adversely affect these species because there is an abundance of other foraging habitat in the vicinity, and most of the habitat in the project area would be only temporarily affected. Construction would also temporarily reduce the amount of habitat available for wildlife along the south bank of the river. Construction practices described above under Alternative 1A and in Appendix C, Environmental Commitments, such as limiting construction to use areas and implementing environmental timeframes to avoid migratory and raptor nesting periods, would further reduce impacts on wildlife. Impacts would be less than significant.

Impacts on wildlife resulting from recreational use of Nimbus Shoals may decrease due to there being fewer users of the shoals. This is because the fish-tight replacement weir would block more adult fish than the existing weir, reducing fishing opportunities.

Wetlands and Sensitive Habitats

No wetlands would be impacted by construction of the new weir. Approximately one acre of "other waters" would be temporarily impacted. Impact mitigation would be determined during the consultation process for CWA Section 404 and 401 and CDFG Section 1602 permits. In addition, environmental commitments (described above under Alternative 1A and in Appendix C) would be implemented to reduce impacts on wetlands and "other waters." Impacts would be less than significant.

No sensitive habitats would be temporarily or permanently affected by implementing Alternative 2.

Special Status Species

Migratory birds, raptors, and silver-haired bat. Migratory birds and raptors nesting in trees nearby or foraging in the area could be temporarily indirectly affected by noise during construction. Impacts are similar to those described for wildlife above and would be less than significant.

Bank Swallow. Noise and human impacts from construction would cause short-term and indirect effects on this species, although no habitat would be directly disturbed. With implementation of Environmental Commitment BIO-11 (Appendix C), impacts would be less than significant.

Northwestern Pond Turtle. Construction would have short-term indirect impacts on this species due to increased noise, human presence, and disturbance of potential basking habitat. Work in the water could cause temporary and localized turbidity and increase suspended sediment in the water column. Compared with Alternatives 1A and 1C, Alternative 2 would temporarily disturb more aquatic habitat for this species. Once construction begins, noise disturbance would cause northwestern pond turtles to avoid the construction area and use adjacent habitats. Environmental Commitments BIO-1, BIO-2, BIO-3, and BIO-4 would be implemented to ensure less than significant project impacts.

There would be no impacts on other special status species.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Public vehicle access with defined parking at Nimbus Shoals would reduce impacts from vehicles. There would be fewer impacts on vegetation, wetlands, and sensitive habitats, such as trampling and erosion, as well as on wildlife and special status species, such as mortality caused by vehicle collisions. With the addition this option, impacts from implementing Alternative 2 would remain less than significant.

Walk-in Only (No Public Vehicle) Access

Impacts on biological resources under the walk-in only (no public vehicles) option are the same as those described for the public vehicle access with defined parking option, but to a lesser degree due to the decrease in vehicle presence. With the addition of this option, impacts from implementing Alternative 2 would remain less than significant.

No Public Access

Eliminating public access would essentially eliminate the impacts on biological resources described above that result from visitor use. This would have a beneficial impact on vegetation and wildlife. With the addition of this option, impacts from implementing Alternative 2 would remain less than significant.

4.2.4 No Action Alternative

No new impacts on vegetation communities, wildlife, wetlands, or special status plants or wildlife would result from implementing the No Action Alternative. Less than significant impacts from recreationists at Nimbus Shoals would continue, such as trampling vegetation, taunting wildlife, or polluting wetlands.

4.3 Recreation

This section describes the potential impacts on recreation in the project area from implementing the alternatives identified in Chapter 2. Impacts on recreation resources were assessed by determining the types of recreation uses in and around the project area, then determining the sensitivity of those uses to the proposed project. Impacts are considered significant if they were to result in the following:

- Disrupt recreation use or interfere with the public's right of access to the project area;
- Prevent long-term recreation use or peak season use or impede or discourage existing recreation;
- Conflict with applicable federal, state, or local recreation policies;
- Increase the use of neighborhood and regional recreation facilities such that the physical deterioration of the facilities would be substantial or accelerated;
- Include recreation facilities or require the construction or expansion of recreation facilities that might have an adverse physical effect on the environment; or
- Physically degrade existing recreation resources.

4.3.1 Alternative 1A

Alternative 1A includes the construction of a modified fish passageway and removal of the diversion weir. The entrance to the modified fish passageway would be in the Nimbus Dam stilling basin, immediately downstream of the dam.

Fishing Regulations

Fishing would be closed all year within 250 feet of the new fish passageway entrance and the Hatchery fishway outfall. These fishing closures are based on fishing regulation 14 CCR 2.35, which states that no fish may be taken within 250 feet of any fishway or egg-taking station or of any dam or any weir or rack that has a fishway or egg-taking station. This closure would be in addition to the seasonal closure from the Hazel Avenue Bridge to the USGS gaging station cable crossing, in accordance with 14 CCR, Part 7.50(b)(5)(B).

Under this alternative, the closure area of the fishway outfall would be the same as the existing closure area. The closure area for the fish ladder would be relocated from the existing weir to the area on Nimbus Shoals near the Nimbus Dam. Removing the weir would allow more fish to move upstream, so anglers would be able to catch fish between the proposed outfall closure area and Hazel Avenue and on the major part of Nimbus Shoals, except for the ladder entrance closure area. Removing the weir also would allow for more fishing opportunities upstream and therefore would result in less than significant impacts on anglers.

Public Access

Construction would be staged on approximately 1.1 acres of the Hatchery parking lot. This would require closing about 65 parking spaces for eight months during the first year for construction of the new fish passageway. Two to three years later, this same area would be closed from May through September for removal of the weir. An additional 0.2-acre staging area in the CSUS Aquatic Center parking lot would require temporarily closing approximately 30 parking spaces, including two parking spaces for the disabled. Construction equipment, including haul trucks, would cross the bike trail at the entrance to the Hatchery and the entrance to Nimbus Shoals. Access to the Nimbus Shoals area by vehicle and foot traffic would be controlled or restricted to ensure public safety during construction of the fish passageway upstream to Hazel Avenue. Parking on Nimbus Shoals would be temporarily closed.

Temporary closures of a portion of the Hatchery parking lot and parking on Nimbus Shoals, as well as access restriction on Nimbus Shoals, would impact visitors to the Hatchery and the Nimbus Shoals area. However, temporary parking impacts are not considered significant, and, as part of Environmental Commitment REC-1, Reclamation would notify the public of the temporary closures of the parking spaces.

After the construction period, Nimbus Shoals would remain open to the public from 6:00 AM to 9:00 PM during the summer and from 7:00 AM to 7:00 PM during the winter, as it currently is. A bridge and roadway across the upper portion of the fish ladder section would be provided to allow public access to the Nimbus Shoals area. A second bridge would span the flume section between the Hatchery and Hazel Avenue Bridge to provide access and egress to the lower portions of the fish ladder and the American River. All facilities constructed would be in conformance with the ADA (Title III Regulations, 28 CFR Part 36). The Hatchery would also remain open to the public. The Hatchery visitor center is currently open daily from 10:00 AM to 3:00 PM, so no long-term access impacts are expected under this alternative. Viewing fish jumping at the weir would no longer be possible after the weir is removed due to the loss of riffle. Placing a viewing plaza at the Hatchery would enhance the viewing opportunities of the visitors and therefore would result in beneficial impacts and improved conditions for visitors to the Hatchery. This would also compensate for the fish jumping viewing that would be lost with the weir removal. Interest in viewing the fish ladder may also draw more visitors to Nimbus Shoals.

Boating

With the removal of the weir, visitors may attempt to launch paddling/rowing watercraft from Nimbus Shoals. However, a county ordinance prohibits boating within 1,000 feet of Nimbus Dam. Further, launching boats by hand from Nimbus Shoals could result in user conflicts between boaters and anglers. To help prevent illegal boating activity, public outreach and education would be conducted to inform the public that boating is not allowed within 1,000 feet of Nimbus Dam for safety and security reasons.

Removing the weir would not improve or impact boating within the project area. Paddling/rowing watercraft could still be launched from most of the lower American River below the weir, subject to local and seasonal restrictions; impacts would be less than significant.

Trails

Construction equipment, including haul trucks, would cross the bike trail and could affect the use of the American River Parkway bike trail during construction. Further, the portion of the trail directly beneath Hazel Avenue would need to be moved up the roadway embankment to make room for the fish passageway. The County of Sacramento would be responsible for the design and reconstruction of the new trail, consistent with their roadway corridor lease agreement with Reclamation. Reclamation and the County of Sacramento would continue to work to integrate the work into the sequence of construction in a way that maintains public safety and complies with all permit conditions. Efforts would be made to minimize the impacts on bike trail use, but temporary trail closure requiring bicyclists to use the crosswalk at the intersection of Hazel Avenue and Gold Country Boulevard would be required during construction of the flume section of the fish passageway (Robinson 2010). Signs would be installed to direct bikers toward the temporary detour. As such, temporary impacts on bike trails would be less than significant.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

The management option of a defined parking area in the Nimbus Shoals area would limit where *visitors* could travel and park in this area, resulting in less available parking. However, the current use of the Nimbus Shoals for parking is uncontrolled. By limiting the areas where vehicles can travel on Nimbus Shoals, user conflicts would be reduced, providing a safer environment for visitors. Therefore, impacts on parking and public access would be less than significant on Nimbus Shoals under this option.

With this management option, visitors would benefit from the amenities that may be provided in the Nimbus Shoals, such as picnic tables, sanitation facilities, trash cans, and interpretive/educational signs. Therefore, this management option would enhance the recreational use of the Nimbus Shoals.

Walk-in Only (No Public Vehicle) Access

The absence of parking spaces in Nimbus Shoals could be inconvenient for visitors. However, this inconvenience would not be significant as parking would be provided at the Hatchery, and Nimbus Shoals would be easily accessed via the foot gate that would be provided as part of this management option. The management option of walk-in only would have the same beneficial effects on the recreational use as those described under the public vehicle access with defined parking option.

No Public Access

This option would affect the recreational use at the project area by prohibiting any access to the Nimbus Shoals. However, this impact would not be considered significant for visitors seeking picnic areas as they can access other recreation areas in the vicinity such as Lake Natoma. However, with no public access, fish viewing at Nimbus Shoals would not be available. This impact would also not be significant as fish viewing would still be available at the Hatchery.

This option would result in fewer fishing opportunities in the project area. This impact would be less than significant because anglers would still be able to fish in the area west of the USGS gaging station crossing. Although this alternative would result in fewer fishing opportunities in the project area, it would indirectly result in beneficial impacts on this recreation resource by increasing the overall abundance of fish in the area through meeting the Hatchery production goals and reducing the lead sinker accumulation. Impacts on fisheries are described in detail under Section 4.1, Fisheries. The abundance of fish would create better sportfishing opportunities within the lower American River.

Fishing opportunities would be available downstream. Further, implementing the Lower American River Salmonid Spawning Gravel Augmentation and Side-Channel Habitat Establishment Program, discussed in Section 4.16.1, would increase and improve salmon and steelhead spawning and rearing habitat. The program would do this by replenishing spawning gravel and establishing additional side-channel habitat in the Lower American River downstream of the Nimbus Dam in Sacramento County. As such, this option would not have significant impacts on recreational fishing.

4.3.2 Alternative 1C

Similar to Alternative 1A, Alternative 1C includes the construction of a modified fish passageway and the removal of the diversion weir. The only difference between Alternative 1A and 1C is that under Alternative 1C, the Fish and Game Commission would implement a new fishing regulation to close fishing year-round between the Nimbus Dam and the USGS gaging station crossing. The new fishing regulations and closures would be at the discretion of the Fish and Game Commission.

The impacts from construction are the same as those described under Alternative 1A. Alternative 1C would result in fewer fishing opportunities in the project area. This impact would be less than significant because anglers would still be able to fish in the area west of the USGS gaging station crossing. Impacts on the other recreation resources, such as public access, boating, and trails, are the same as those described under Alternative 1A.

Although this alternative would result in fewer fishing opportunities in the project area, it would indirectly result in beneficial impacts on this recreation resource by increasing the overall abundance of fish in the area through meeting the Hatchery production goals and reducing the lead sinker accumulation. Impacts on fisheries are described in detail under Section 4.1, Fisheries. The abundance of fish would create better sportfishing opportunities within the lower American River.

Fishing opportunities would be available downstream. Further, implementing the Lower American River Salmonid Spawning Gravel Augmentation and Side-Channel Habitat Establishment Program, discussed in Section 4.16.1, would increase and improve salmon and steelhead spawning and rearing habitat. The program would do this by replenishing spawning gravel and establishing additional side-channel habitat in the Lower American River downstream of the Nimbus Dam in Sacramento County. As such, Alternative 1C would not have significant impacts on recreational fishing.

4.3.3 Alternative 2

Alternative 2 involves replacing the diversion weir with a six-bay bypass and a denil fish ladder. The fishing closures within 250 feet of the fish ladder entrance and outfall would remain in effect. Under this alternative, access to the Nimbus Shoals and the Hatchery would continue. Similar to Alternative 1A, temporary closure of a portion of the Hatchery parking lot for construction staging would have less than significant impacts.

The entrance to the fish ladder would be modified to have four entrances direct fish into the Hatchery. These entrances would be in operation from early September through late December each year, which is similar to current operations. However, because the new weir would be fish tight, fewer steelhead or chinook would be likely to bypass the weir and continue upstream to the stilling basin. As the new weir would likely result in fewer adult fish passing up to the stilling basin, there could be fewer sportfishing harvest opportunities in the project area between the new weir and the Nimbus Dam. As such, under this alternative, impacts on sportfishing conditions at the project area would be greater than those described under Alternative 1A but would remain less than significant. Fishing closures would be consistent with existing regulations and would essentially be the same as current closures around the ladder entrance and fishway outfall.

This alternative would not provide for the appropriate conditions for hand launching paddling/rowing watercraft from Nimbus Shoals, as planned for in the General Plan for Folsom Lake SRA, because boaters could become entrained on the weir. Similar to current conditions, boating opportunities downstream of the Hatchery along the lower American River would continue to be available.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Impacts would be the same as under Alternative 1A.

Walk-in Only (No Public Vehicle) Access

Impacts would be the same as under Alternative 1A.

No Public Access

This management option would affect the recreational use of the project area by prohibiting any access to Nimbus Shoals. However, this impact would not be considered significant for visitors seeking picnic areas as those visitors could access other recreation areas in the vicinity, such as Lake Natoma. Because sportfishing conditions would already be impacted by the new weir, the additional impact on fishing by eliminating public access to Nimbus Shoals would be less than significant.

4.3.4 No Action Alternative

The No Action Alternative would retain the weir, and no new fish passageway would be constructed. No new major construction would take place, and fishing regulations would remain the same. There would be no new impacts on recreation.

4.4 Cultural Resources

The proposed project would have an adverse impact on cultural resources if it were to conflict with the regulations, policies, and laws of Section 106 of the NHPA, the NAGPRA, the ARPA, the AIRFA, and EOs 13007 and 13175, as discussed in Section 3.4.

Implementing the proposed project would also have a significant impact on cultural resources if it were to cause a substantial adverse change in the following resources protected under CEQA:

- A historical resource, as defined in CEQA Guidelines, PRC Section 15064.5;
- An archaeological resource, in accordance with Section 15064.5;
- A unique paleontological resource or site or unique geologic feature; or
- Human remains, including those interred outside established cemeteries, in accordance with Section 15064.5(d) (evaluated in this section).

Paleontological resources and unique geologic features are discussed under Geology and Soils in Sections 3.5 and 4.5.

4.4.1 Alternative 1A

Archaeological Resources

Impacts on known archaeological resources, such as CA-SAC-180 and CA-SAC-308H (LN-8), are not expected to occur under Alternative 1A. Although the general location of CA-SAC-180 is within the northern extent of the APE, the site likely no longer exists, following construction of Nimbus Dam. The recorded boundaries of CRHR- and NRHP-ineligible archaeological site CA-SAC-308H are approximately 256 feet from the southern boundary of the APE. Although the documented boundaries of the site are outside of the APE, subsurface deposits associated with the site may extend into the APE. It is also possible that unidentified resources could be present within the APE in unsurveyed areas or subsurface.

There is a potential to significantly impact unrecorded or subsurface archaeological resources in the direct impact zones of the weir, flume, ladder, rock channel, auxiliary water supply pipes, and construction access pathways and staging area on Nimbus Shoals. However, such impacts would be reduced to less than significant by implementing the following mitigation measure:

> To avoid impacts on unanticipated archaeological resources, all work within the vicinity of any potential archaeological finds would be halted

> until Reclamation cultural resources staff could assess the find. Work would not recommence until the requirements of Section 106 (36 CFR, Part 800.13) regarding unanticipated discoveries have been met.

There is also potential for water flow from the fish outfall to impact downstream shoreline archaeological sites through erosional processes. However, the contribution to downstream erosion from Alternative 1A is expected to be minimal, if not the same as it is currently; as such, impacts on archaeological resources due to erosion are expected to be less than significant.

Ethnographic Resources

No ethnographic resources have been identified at this time and consultations are ongoing. However, Native Americans could identify resources or concerns that may be impacted by the proposed project. This impact could be reduced to less than significant by implementing mitigation measure discussed under Archaeological Resources and the following mitigation measure:

> Reclamation would continue to consult with Native Americans throughout the course of the project. The consultations would allow Reclamation to avoid and address any potential impacts on Native American resources should any be identified through the consultation process.

Historic Architecture

Reclamation surveyed and evaluated the Nimbus Fish Hatchery complex and determined it is not eligible for listing on the NRHP individually or as part of a historic district. The SHPO concurred with Reclamation's findings on September 7, 2010. Therefore, it does not qualify as a historic resource, and there would be no historical architectural resources impacted under Alternative 1A.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Archaeological Resources. No archaeological resources are documented on Nimbus Shoals. Although minimal erosion is anticipated as a result of public vehicle use and the parking area, and therefore exposure of subsurface archaeological resources is unlikely, implementation of the archaeological resources mitigation measure outlined above and compliance with the NHPA, Section 110, would limit any unanticipated impacts to less than significant.

Ethnographic Resources. No ethnographic resources have been identified at this time, and consultations are ongoing. Implementing the mitigation measures outlined above would reduce any potential impacts on resources that may be identified during the ongoing consultation process.

Historic Architecture. No historical architectural resources are within or near the project's APE. Therefore, no historic properties would be affected.

Walk-in Only (No Public Vehicle) Access

Archaeological Resources. Impacts on archaeological resources under the walk-in only (no public vehicles) option are the same as those described for the public vehicle access with defined parking option, but to a lesser degree due to the decrease in anticipated erosion.

Ethnographic Resources. Impacts on ethnographic resources under the walk-in only (no public vehicles) option are similar to those described for the public vehicle access with defined parking option.

Historic Architecture. No historical architectural resources are within or near the project's APE. Therefore, no historic properties would be affected.

No Public Access

Archaeological Resources. Impacts on archaeological resources under the no public access option are the same as those described for the public vehicle access with defined parking option, but to a considerably less degree due to the greater decrease in anticipated erosion.

Ethnographic Resources. Impacts on Native American resources under the no public access option are similar to those described for the public vehicle access with defined parking option.

Historic Architecture. No historical architectural resources are within or near the project's APE. Therefore, no historic properties would be affected.

4.4.2 Alternative 1C

Archaeological Resources

Impacts on archaeological resources under Alternative 1C are similar to those described for Alternative 1A.

Ethnographic Resources

Impacts on ethnographic resources under Alternative 1C would have impacts similar to Alternative 1A. Implementing the mitigation measures outlined above would reduce any potential impacts on resources that may be identified during the ongoing consultation process.

Historic Architecture

Impacts on historic architectural resources under Alternative 1C are the same as those described for Alternative 1A.

4.4.3 Alternative 2

Archaeological Resources

Impacts on archaeological resources under Alternative 2 are less than those under Alternative 1. No ground-disturbing activities would occur within the recorded boundaries of archaeological site CA-SAC-308H or in areas adjacent to the site where associated subsurface deposits may occur, and no viewing plaza would be constructed. All construction would be limited to the river, where the presence of archaeological resources is considered unlikely, so there are no significant impacts on archaeological resources under Alternative 2.

Ethnographic Resources

Impacts on ethnographic resources under Alternative 2 would have impacts similar to Alternative 1A. Implementing the mitigation measures outlined above would reduce any potential impacts on resources that may be identified during the ongoing consultation process.

Historic Architecture

Impacts on historic architectural resources under Alternative 2 are the same as those identified under Alternative 1A.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Impacts from Alternative 2 are the same as those described for Alternative 1A.

Walk-in Only (No Public Vehicle) Access

Impacts from Alternative 2 are the same as those described for Alternative 1A.

No Public Access

Impacts from Alternative 2 are the same as those described for Alternative 1A.

4.4.4 No Action Alternative

Archaeological Resources

No impacts on archaeological resources are expected under the No Action Alternative since no ground-disturbing activities would occur.

Ethnographic Resources

Under the No Action Alternative, impacts on ethnographic resources would be similar to Alternative 1A.

Historic Architecture

There are no impacts on historic architectural resources under the No Action Alternative.

4.5 Geology and Soils

The proposed action was evaluated for adverse effects on people or the environment in the context of existing geologic conditions at the project area. The proposed project would have a significant impact on geology and soils if it were to result in any of the following:

- Expose people or structures to geologic hazards, including seismic hazards;
- Substantially erode soil or cause the loss of topsoil;
- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in an on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property; or
- Change substantially the topography or any unique geologic or physical features of the site.

There are no known mineral resources in the project area; therefore, none of the project alternatives would impact mineral resources.

4.5.1 Alternative 1A

The fish passageway would be built and the weir would be removed over three years, and impacts on geology and soils would be less than significant over this entire period. The project area does not lie in or next to an Alquist-Priolo Earthquake Fault Zone, and active faulting has not been mapped across or next to the project area (County of Sacramento, DERA 2006b). The nearest fault zone to the project area is the Bear Mountain Fault, upstream of Folsom Lake, over 10 river miles from the project area. Implementing Alternative 1A would have a beneficial impact with regard to earthquake effects (rupture of a known fault zone, seismic shaking, liquefaction, or landslides) because it would remove the weir, a large concrete structure, from the river. Potential adverse effects on people or structures would be reduced because of the removal of this large structure from the project area.

Construction of the fish passageway and removal of the weir may result in some erosion and loss of topsoil, but these effects are not expected to be substantial. Additionally, BMPs, such as using silt fences or straw bales for erosion control, would minimize potential impacts, so this alternative would have less than significant impacts from soil erosion or the loss of topsoil. Soils in the project area are classified as Urban-land Natoma complex and Xerothents, neither of which is considered expansive or unstable; therefore, this alternative would have less than significant impacts from creating substantial risks to life or property or a potential to result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Erosion resulting from recreational use of Nimbus Shoals may slightly increase. This would be due to the attraction of the fish ladder and increased fish in the shoals area, which may result in more recreationists; impacts would be less than significant. Implementing Alternative 1A would not substantially alter the topography or any unique geologic or physical features of the project area, so the project would have a less than significant impact on to these resources.

The project would also disturb river sediments during removal of the diversion weir. Water velocity through and across the weir is sufficiently high that little sedimentation is expected to have taken place; therefore, construction would not mobilize a large amount of material, and impacts would be less than significant. Impacts from disturbing river sediments are further discussed in Section 4.6, Water Resources.

Paleontological Resources

In the area of the proposed action, the Laguna Formation is exposed on the north side of the river. The disturbance related to the proposed action would not affect the Laguna Formation, so there would be no effect on paleontological resources.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

The development of a defined parking area on Nimbus Shoals would reduce erosion that occurs from vehicle use on the shoals, resulting in a beneficial impact. The defined parking area would not be paved, and erosion could occur in this area. Erosion in the parking area would be less than significant because the topography of the shoals is flat and the soil in the parking area would be compacted by consistent vehicle use.

Paleontological Resources. The Laguna Formation is not exposed on Nimbus Shoals, and although public vehicles and a parking area are expected to contribute slightly to erosion, the extent of erosion is not expected to expose bedrock. As such, there would be no effect on paleontological resources.

Walk-in Only (No Public Vehicle) Access

Allowing only administrative vehicles to access Nimbus Shoals would essentially eliminate erosion from vehicle use on the shoals in the long term, resulting in a beneficial impact.

Paleontological Resources. Impacts on paleontological resources under the walk-in only (no public vehicles) option are the same as those described for the public vehicle access with defined parking option, but to a lesser degree due to the decrease in anticipated erosion.

No Public Access

Like the walk-in only option, allowing only administrative vehicles to access Nimbus Shoals would essentially eliminate erosion from vehicle use on the shoals in the long term, resulting in a beneficial impact.

Paleontological Resources. Impacts on paleontological resources under the no public access option are the same as those described for the public vehicle access with defined parking option, but to a considerably less degree due to the greater decrease in anticipated erosion.

4.5.2 Alternative 1C

Impacts from Alternative 1C are similar to those described for Alternative 1A, except that erosion from recreation use of Nimbus Shoals may decrease rather than increase, as under Alternative 1A, since there would likely be fewer users of the shoals with the implementation of the fishing closure.

Paleontological Resources

Impacts on paleontological resources under Alternative 1C are similar to those described for Alternative 1A.

4.5.3 Alternative 2

Alternative 2 would have a two-year construction period and may result in some erosion and loss of topsoil. Impacts related to disturbing river sediments would be similar to those described under Alternative 1A. Impacts from construction would be minimized through BMPs, including the preparation of an erosion control plan. Erosion resulting from recreation use of Nimbus Shoals may decrease from fewer users since the replacement weir would block more fish, reducing fishing opportunities. Therefore, impacts on geology and soil are expected to be less than significant.

Paleontological Resources

Impacts on paleontological resources under Alternative 2 are similar to those described for Alternative 1A. However, since Alternative 2 does not include a viewing plaza, the area of excavation is decreased and the possibility to encounter paleontological resources is reduced.

Visitor Management Options for Nimbus Shoals

<u>*Public Vehicle Access with Defined Parking*</u>

Impacts from Alternative 2 are the same as those described for Alternative 1A.

<u>*Walk-in Only (No Public Vehicle) Access*</u>

Impacts from Alternative 2 are the same as those described for Alternative 1A.

<u>*No Public Access*</u>

Impacts from Alternative 2 are the same as those described for Alternative 1A.

4.5.4 No Action Alternative

The No Action Alternative would not have any construction impacts. Less than significant erosion impacts from recreational use of the shoals, described in Section 3.5, would continue; there would be no new impacts.

Paleontological Resources

No impacts on paleontological resources are expected under the No Action Alternative since no ground-disturbing activities would occur.

4.6 Water Resources and Water Quality

The evaluation of potential impacts on water resources is based on the project's potential to affect water quality, surface water runoff volumes, drainage patterns, and flood hazards. The proposed project would have a significant impact on hydrology and water quality if it were to result in the following:

- Violate any water quality standards or waste discharge requirements;
- 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;
- Substantially alter the drainage pattern of the site or area, including by altering the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site;
- Substantially increase the potential for flooding or the amount of damage that could result from flooding;
- Create or contribute to runoff water, which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
- Otherwise substantially degrade water quality.

4.6.1 Alternative 1A

The fish passageway would be built and the weir would be removed over three years, and impacts on water resources and water quality would vary during this period. The greatest potential impacts would occur in year three, when the weir is scheduled for removal, pending an evaluation of the new fish passageway performance. Weir removal would be limited to June through September to protect adult salmon and steelhead and to avoid high flood releases. Weir removal would affect an area 35 feet upstream and downstream of the weir, or approximately half an acre.

The major hydrologic impacts from weir removal are changes in the American River water surface elevations. The Nimbus Dam tailrace water surface elevations are controlled by the elevation of the crest of the weir, approximately 77.5 feet msl. Removing the weir would reduce the water surface elevation from 2.7 feet to 0.8 foot, depending on the releases from the dam. Once the weir is removed, the controlling factor for water surface elevations would be the riffle at the downstream end of the Hatchery, approximately 800 feet downstream of the weir. A reduction in the water surface elevation upstream of the weir would result in higher flow velocities in this area.

The highest flows upstream of the weir are along the north bank of the river. Once the weir is removed, these higher flows would likely continue along the north bank but would persist farther downstream. Changes in flow patterns and velocities in the American River would cause some changes in the geomorphology of the river, but not enough to substantially alter the drainage pattern of the site or area or within the river.

Weir removal would involve cutting off the piers, removing the sheet pile, wire, and rebar in the weir foundation and surrounding river bottom, and removing rocks and debris from the river channel and redistributing them along the channel bottom. These activities would disturb the river sediments, temporarily increasing river turbidity. Increased turbidity would subside once in-river construction is completed. Factors that would reduce impacts from the removal are as follows:

- In-river activities would be for a maximum of four months (June through September), which would limit the duration of the impacts;
- This area is close to the stilling basin from the dam, and there should be relatively little sediment in this section of the river; and
- Flows would be reduced to a maximum of 1,000 cfs during weir removal, reducing the energy of the river to mobilize and carry sediment.

The lower American River has been identified as impaired for mercury, and this pollutant could be mobilized when the sediments are disturbed. However, pollutant impacts would be reduced by the three factors cited above, and weir removal should not significantly increase toxicity in the water.

The fish passageway, including the concrete flume, a fish ladder, and a rock-lined channel would be built during the first year of the project. Most of this construction would be outside the river channel, although construction of the rock-lined channel portion of the fish passageway would require some in-river work. During construction, there would be an increased potential for water quality degradation due to disturbance of river sediments and silt runoff from disturbed areas. Most of the impacts on water resources and water quality from constructing the new fish passageway would be from erosion along the river bank, where construction would take place. BMPs, such as turbidity curtains, silt fences, or straw bales for erosion control, would be implemented to minimize potential river siltation.

Potential sources of water quality degradation from recreational use of Nimbus Shoals are leaks or spills of oil, fuel, or antifreeze from vehicles parked near the water’s edge, siltation from erosion caused by vehicle travel, and damage to wetlands by vehicle travel. Water quality degradation from recreational use of Nimbus Shoals may slightly increase due to the attraction of the fish ladder and increased number of fish in the shoals area, which may result in more recreationists; impacts would be less than significant.

This alternative would have less than significant impacts or no impacts with regard to the significance criteria. Groundwater would not be encountered during construction, so this alternative would not substantially deplete groundwater supplies or interfere with groundwater recharge. As noted above, this alternative would not substantially alter the drainage pattern of the river or the area. Additionally, this alternative would not create or contribute runoff water. Finally, while this alternative may have some water quality impacts, these would be less than significant, and impacts would be minimized by implementing BMPs and the environmental commitments for water quality (Appendix C).

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Water quality degradation from recreational use, as described under Alternative 1A, would be reduced because the defined parking area would be on higher ground away from the water's edge and sensitive areas such as wetlands. This would result in a beneficial impact.

Walk-in Only (No Public Vehicle) Access

Limiting vehicle access to Nimbus Shoals to administrative vehicles would eliminate water quality degradation associated with recreational use of the area, resulting in a beneficial impact.

No Public Access

Like the walk-in only option, limiting vehicle access to Nimbus Shoals to administrative vehicles would eliminate water quality degradation associated with recreational use of the area, resulting in a beneficial impact.

4.6.2 Alternative 1C

Impacts from Alternative 1C are similar to those described for Alternative 1A, except that water quality degradation resulting from recreational use of Nimbus Shoals may decrease, rather than increase as under Alternative 1A, since there would likely be fewer users of the shoals with the implementation of the more-restrictive fishing closure.

4.6.3 Alternative 2

Construction for Alternative 2 would take two years, and all in-river construction would be limited to four months, June through September. Hydrologic impacts would be caused by the different geometry of the new weir, as well as by the multiple configurations the new weir would be able to operate in. With the bypasses of the weir closed (when flow is below 7,000 cfs), flow would not change direction and higher flows would continue down the north bank. With the bypasses open, flow would be concentrated along the south bank, with increased velocities downstream of the weir along the south bank.

A significant alteration in the river flow pattern would occur during in-river construction because of the need to construct coffer dams and divert river flows to either the north or south side of the river during construction of different segments of the weir. The temporary change in the river flow pattern over portions of two years would have little or no impact on the river's geomorphology. The weir replacement would be constructed inside a coffer dam, and leakage would be pumped to settling ponds or a filtration system to prevent sediment from entering the river.

Overall, the alteration in the river flow pattern would not result in substantial erosion or siltation on- or off-site and would not substantially increase flooding potential.

The existing weir would be removed in a process similar to that described for Alternative 1A, and similarly, these activities would disturb the river sediments, causing a temporary increase in river turbidity. Increased turbidity would subside once in-river construction is completed. Factors that would reduce impacts from the weir removal are the same as those described under Alternative 1A.

Pollutant impacts from mercury are similar to those for Alternative 1A, with impacts reduced by the three factors mentioned above.

The addition of new entrances to the fish ladder would also require some in-river construction, and these activities would take place close to the south bank of the river. Most of the impacts on water resources and water quality from constructing the new entrances would be from erosion along the river shore, where the construction would take place. BMPs, such as turbidity curtains, silt fences, or straw bales for erosion control, would be implemented to minimize potential siltation of the American River from construction.

Water quality degradation resulting from recreational use of Nimbus Shoals may decrease because there may be fewer users of the shoals since the replacement weir would block more fish than the existing weir, reducing fishing opportunities.

This alternative would have less than significant impacts or no impacts with regard to the significance criteria. Groundwater would not be encountered during construction, so this alternative would not substantially deplete groundwater supplies or interfere with groundwater recharge. As noted above, this alternative would not permanently substantially alter the drainage pattern of the river or the area. The temporary alterations in the river flow patterns during removal of the existing weir and construction of the new weir would result in less than significant impacts with regard to increased siltation and erosion and would result in less than significant impacts from increased flooding. Additionally, this alternative would not create or contribute runoff water. Finally, while this alternative may have some water quality impacts, these would be less than significant, and impacts would be minimized by implementing BMPs and the environmental commitments for water quality (Appendix C).

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Impacts from Alternative 2 are the same as those described for Alternative 1A.

Walk-in Only (No Public Vehicle) Access

Impacts from Alternative 2 are the same as those described for Alternative 1A.

No Public Access

Impacts from Alternative 2 are the same as those described for Alternative 1A.

4.6.4 No Action Alternative

The No Action Alternative would not result in any construction-related impacts. Less than significant water quality impacts resulting from recreational use of the shoals, as described in Section 3.6, would continue; there would be no new impacts.

4.7 Hazardous Materials and Waste

The proposed project would result in a significant impact with regard to hazardous materials and waste if it were to result in the following:

- Conflict with relevant federal, state, and local statutes and regulations related to hazardous materials, hazardous waste, and solid waste;
- Substantially increase the risk of a release of hazardous substances;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials;
- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Be located on a site that is included on a list of hazardous materials sites compiled under California Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;
- Generate hazardous emissions or require hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school; or
- Substantially increase the risk of accidental explosion or fire hazards.

The potential environmental impacts of implementing the proposed project alternatives are evaluated in the following sections.

4.7.1 Alternative 1A

Construction

Constructing the fish passageway and removing the weir would require that hazardous materials be transported to, temporarily stored on, and used at the project area. Common hazardous materials that would likely be found at the site during construction are petroleum, oils, lubricants, solvents, and cleaners, primarily used for operating construction equipment. The temporary presence and use of these materials at the project area would increase the risk of a release of hazardous materials to the environment. The risk of fires and explosion hazards would also be increased because flammable and potentially explosive materials would be present at the site during construction.

Adverse impacts would be less than significant because construction would comply with all applicable federal, state, county, and municipal laws, ordinances, and regulations and because BMPs would be used to reduce the risk of a release of hazardous substances and to protect human health and the environment. By complying with applicable regulations and implementing BMPs, the project would not exceed the significance criteria listed above. BMPs for hazardous materials and waste, many of which are required by regulation, are as follows:

- Transport, store, handle, and dispose of all hazardous materials and waste in compliance with all applicable federal, state, county, and municipal laws, ordnances, and regulations;
- Store only the minimum amount of hazardous materials and waste required for the minimum amount of time required to complete the job;
- Prevent hazardous materials from entering the soil or surface waters at the site and store hazardous materials in appropriate designated staging areas away from surface water bodies and stormwater drainages to prevent accidental contamination of soil or water;
- Store hazardous materials on impervious surfaces, such as plastic groundcovers, or provide secondary containment so that minor spills do not contaminate the ground;
- Ensure that hazardous materials containers are properly labeled, are in good condition, and are properly sealed when not in use;
- Contain all hazardous waste, tailings, and drilling fluids and dispose of them properly off-site;
- Prepare and implement a spill prevention control and countermeasure (SPCC) plan;
- Obtain an NPDES general permit for construction activities with regard to managing stormwater discharge;
- Keep an adequate supply of spill response materials nearby, instruct workers in proper spill response procedures, and clean up any spills immediately;
- Use drip pans to contain minor leaks from construction equipment, and refuel, clean, and repair construction equipment off-site;
- Designate qualified personnel to oversee the delivery and storage of hazardous materials and periodically inspect the job site to ensure regulatory compliance;
- Control solid waste by providing trash receptacles, prohibiting littering, and cleaning up debris at the site regularly;

- Protect air quality by enclosing, covering, or watering disturbed soil, soil piles, haul roads, and haul trucks; and

- Remove all hazardous materials and construction debris from the project area when construction is complete and restore the project area as necessary.

The use and storage of hazardous materials and waste at the project area during construction would also increase health and safety risks. These impacts are discussed in Section 4.8.

Although groundwater contamination associated with Aerojet exists in the project area, groundwater is far enough below the surface that construction workers would not likely encounter it. Surface water, soil, and sediment that would be encountered during construction are not expected to be contaminated by the Aerojet plume.

There is some possibility that construction could uncover unforeseen contamination. As a BMP, Reclamation or a designated contractor would prepare a contingency plan that would include steps to contain, characterize, evaluate, and dispose of any such contamination. The appropriate regulatory agencies would be notified should any unforeseen contamination be encountered.

Operation and Maintenance

Operation and maintenance of the fish passageway would not require the use of hazardous materials or generate hazardous waste. Solid waste in the form of litter discarded by recreationists would need to be periodically removed from the fish passageway and surrounding area. The fish passageway would draw additional visitors to Nimbus Shoals, which would result in a less than significant impact from an increase in solid waste as litter in the area and an increase in the potential for leaks and spills of vehicle fuel, oil, and antifreeze.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

The potential for leaks or spills of hazardous materials from vehicles parked near the water's edge would be eliminated because the defined parking area would be on higher ground, away from the water's edge, resulting in a beneficial impact. Leaks or spills from vehicles could occur in the parking area, but these releases would be minor or negligible because they would be confined to soil in the immediate area and would not likely enter the water or sensitive areas, such as wetlands. Increased visitation resulting from increased numbers of fish in the stilling basin and a desire to view fish in the fish passageway would result in a less than significant increase in litter discarded in the area.

Walk-in Only (No Public Vehicle) Access

Under this option, vehicle access to Nimbus Shoals would be reduced to a relatively small number of administrative trips, greatly reducing the potential for hazardous materials to leak or spill from vehicles and enter the lower American River, resulting in a beneficial impact. The impact on the amount of litter discarded in the area would be minor because increased visitation would be limited by visitors unwilling to walk to the Shoals area from nearby parking areas.

No Public Access

Under this option, vehicle access to Nimbus Shoals would be reduced to a relatively small number of administrative trips, greatly reducing the potential for hazardous materials to leak or spill from vehicles and enter the lower American River and resulting in a beneficial impact. The amount of litter discarded in the area would be reduced to litter blowing in from nearby areas, resulting in a beneficial impact.

4.7.2 Alternative 1C

Adverse impacts are the same as those described under Alternative 1A. Implementing the fishing closure would reduce the number of lead sinkers released into the lower American River, resulting in a negligible beneficial impact.

4.7.3 Alternative 2

Adverse impacts are similar to those described under Alternative 1A. However, the extent of construction and the area affected by construction would be reduced, which would lessen the impacts somewhat, compared to Alternative 1A. Impacts would be less than significant.

The extent and frequency of weir maintenance would increase, compared to existing conditions. The weir gates would require periodic lubrication, which would be accomplished with biodegradable oil approved for use in the water. The weir is designed to permit vehicle access to the crest when river flows are less then 5,000 cfs. Vehicles would be checked for leaks before accessing the weir and would remain on the weir only long enough to complete the required maintenance. Given these precautions, the risk of hazardous materials entering the river would be low, so impacts from weir maintenance would be less than significant.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Impacts are similar to those described under Alternative 1A; however, because the new fish-tight weir would result in reduced visitation to Nimbus Shoals, litter would be reduced.

Walk-in Only (No Public Vehicle) Access

Impacts are similar to those described under Alternative 1A; however, because the new fish-tight weir would result in reduced visitation to Nimbus Shoals, litter would be reduced.

No Public Access

Impacts are the same as those described under Alternative 1A.

4.7.4 No Action Alternative

The No Action Alternative would not require construction or other new activities in the project area that would involve the routine transport, storage, use, or disposal of hazardous materials, so no impacts would occur.

The weir would continue to require maintenance and periodic significant repairs, potentially involving the use of hazardous materials, such as fuels, oil, lubricants, and solvents, primarily to operate construction equipment. Solid waste, primarily trash discarded by recreationists, would continue to be deposited in the project area, would become lodged on the weir, and would continue to require removal. These impacts would be less than significant.

4.8 Public Health and Safety

The proposed project would have a significant impact on public health and safety if it were to result in the following:

- Expose people or the environment to a potential health hazard;
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires; or
- Substantially increase safety risks to workers and the public.

The potential environmental impacts of implementing the proposed project alternatives are evaluated in the following sections.

4.8.1 Alternative 1A

Construction

The temporary presence and use of hazardous materials at the project area increase the risk of accidents that could affect the health and safety of workers and other persons in the vicinity. The following BMPs would be used to reduce these risks to less than significant:

- Workers would be notified of any potential health hazards associated with hazardous materials at the project area;
- Material safety data sheets would be available on-site for workers to review;
- A site-specific health and safety plan would be developed and would include detailed information on safe work practices, proper health and safety procedures, and emergency procedures;
- Workers performing activities that could expose them to hazardous substances would be trained and certified by the Occupational Safety and Health Administration; and
- Fences and signs would be used at the project area as necessary to control access and to make workers and the public aware of potential hazards.

BMPs for hazardous materials and waste management are listed in Section 4.7.

As discussed in Section 3.8, there are areas that could be affected by wildland fires at the project area, next to development. Fuels and other hazardous materials that would likely be used during construction are flammable; however, the risk of wildland fires would be less than significant, as long as proper hazardous materials management techniques were used. Refer to Section 4.7 for a description of hazardous materials management BMPs to be used at the site. Appropriate equipment to combat minor fires would be kept at the project area, and workers would be instructed to properly use this equipment. Workers would be instructed to call 911 or Metro Fire if a fire could not be readily extinguished.

As discussed in Section 3.7, the Aerojet Superfund site is in the project vicinity. Groundwater contamination associated with the site extends underneath the project area. Although groundwater contamination exists in the project area, groundwater is sufficiently below the surface, and construction workers would not likely encounter it. Surface water, soil, and sediment that would be encountered during construction are not expected to be contaminated by the Aerojet plume.

Operation and Maintenance

Boating opportunities would not change under Alternative 1A, so no impacts would occur. Boating is not allowed within 1,000 feet of Nimbus Dam by County ordinance.

The fish passageway would have fencing over the flume and ladder sections and access control at the transition area between the ladder and rock channel. The risk of accidents in and around the fish passageway is considered less than significant. Because the current risks associated with installing, removing, and maintaining the weir would be eliminated once the weir is removed, and because maintenance of the fish passageway would not involve in-river work, the overall impact would be beneficial.

Increased visitor use of Nimbus Shoals would likely occur under Alternative 1A due to the additional fish in the stilling basin. Visitors to Nimbus Shoals are exposed to public health and safety risks, including drowning, injury, or death from flow increases and vandalism and car break-ins. Unlimited vehicle access causes user conflicts. While the number of incidents at Nimbus Shoals may increase due to increased visitation, the probability of an incident occurring would be similar to existing conditions; therefore, impacts would be less than significant.

A viewing plaza at the Hatchery would have beneficial impacts on public safety. A viewing plaza would presumably provide visitors with a safe place to view fish.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Public health and safety risks would be similar to those described under no change in access, with the exception of user conflicts, which would be reduced by limiting vehicles to a defined parking area, resulting in a beneficial impact.

Walk-in Only (No Public Vehicle) Access

Visitor use is expected to increase, but less than under no change in access or public vehicle access with defined parking. This is because of visitors' unwillingness to walk to the shoals from nearby parking areas. Both less than significant adverse impacts and beneficial impacts would occur. Vandalism and car break-ins on neighboring roads could increase because vehicles would be unattended. The risk of injury or death from flow increases would likely decrease because visitors would be more likely to evacuate the area quickly if they were not concerned with their vehicles. User conflicts related to vehicle access would be eliminated.

<u>*No Public Access*</u>

All of the public health and safety risks described above would be eliminated if the public were not allowed to access the shoals, resulting in a beneficial impact.

4.8.2 Alternative 1C

Impacts would be the same as those described under Alternative 1A.

4.8.3 Alternative 2

Construction

Adverse impacts are similar to those described under Alternative 1A. Under Alternative 2, the construction area would be more confined and easier to control, which would lessen the risks and impacts to the general public slightly; however, worker risk may be greater since more in-water construction would be required.

Operation and Maintenance

As described in Chapter 2, the weir would no longer have to be installed and removed annually; however, maintenance of the new weir would be extensive, given the number and complexity of the movable parts associated with the bypass gates and pickets, hydraulic systems, and multiple ladder entrances. Maintenance workers would follow safety procedures similar to those followed for maintaining the weir, which are described in Section 3.8. Although the replacement weir would require additional maintenance, the magnitude of health and safety risks is similar to current conditions due to safety procedures being put in place and the use of trained personnel to maintain the weir; therefore, impacts would be less than significant.

Boating opportunities would not change under Alternative 2, so no impacts would occur. Boating is not allowed within 1,000 feet of Nimbus Dam by County ordinance.

Decreased visitor use of Nimbus Shoals would likely occur under Alternative 2 due to the reduced amount of fish in the stilling basin. Public health and safety risks would decrease commensurately, specifically the risk of drowning and injury or death from flow increases and vandalism and car break-ins. This would result in a beneficial impact.

Visitor Management Options for Nimbus Shoals

<u>*Public Vehicle Access with Defined Parking*</u>

Public health and safety risks would be similar to those described under no change in access. In addition, user conflicts would be reduced by limiting vehicles to a defined parking area, resulting in a beneficial impact.

Walk-in Only (No Public Vehicle) Access

Public health and safety risks would be similar to those described under public vehicle access with defined parking. User conflicts related to vehicle access would be eliminated, resulting in a beneficial impact.

No Public Access

All of the public health and safety risks described above would be eliminated if the public were not allowed to access the shoals, resulting in a beneficial impact.

4.8.4 No Action Alternative

The No Action Alternative would not require construction or other new activities in the project area, and no impacts would occur. Existing public health and safety issues, including weir maintenance and operation, vandalism, vehicle break-ins, fire risk, flooding hazards, and boating hazards, would continue, as described in Section 3.8; impacts would be less than significant.

4.9 Infrastructure

Impacts on infrastructure are divided into impacts on utilities, public services, and transportation and traffic. The proposed project would result in a significant impact on utilities if it were to result in the following:

- Increase demand for utilities in excess of available capacity;
- Substantially interrupt utility service or disturb existing utilities;
- Exceed wastewater treatment requirements of the CVRWQCB;
- Require or result in the construction of new water, wastewater treatment, or stormwater drainage facilities or expansion of existing facilities, which could cause significant environmental effects;
- Require water supplies in excess of existing supplies or require new or expanded entitlements; or
- Require hazardous and solid waste disposal that exceeds the capacity of regional landfills.

The proposed project would result in a significant impact on public services if it were to result in the following:

- Increase demand for public services in excess of available capacity;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- Result in substantial adverse physical or environmental impacts from providing new or physically altered government facilities; or
- Degrade acceptable service ratios, response times, or other performance objectives for any public service, including fire protection, police protection, schools, and parks.

The proposed project would result in a significant impact on transportation and traffic if it were to result in the following:

- Significant traffic delays during peak commute hours;
- An increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system;

- Change in air traffic patterns;
- Substantially increased hazards due to a design feature, such as a sharp curve, or incompatible uses, such as farm equipment;
- Inadequate emergency access;
- Inadequate parking capacity; or
- Conflicts with adopted policies, plans, or programs supporting alternative transportation, such as bus turnouts and bicycle racks.

The potential environmental impacts of implementing the proposed project alternatives are evaluated in the following sections.

4.9.1 Alternative 1A

Utilities

The proposed project would not disturb overhead and underground utilities in the project vicinity or interrupt utility service to the surrounding community. The proposed project would not require natural gas, telephone, or television service. Impacts on other utilities are discussed below.

Water and Wastewater. The fish passageway would require an auxiliary water flow system. As described in Chapter 2, the auxiliary flow system would introduce water at both the bottom of the ladder section and at the entrance to the fishway. It would be a flow-through system that draws water from Lake Natoma, via gravity feed through an unused 42-inch pipeline, which roughly parallels the 60-inch pipeline that provides water for Hatchery operations (Robinson 2009a). A valve vault would be installed along the 42-inch pipeline approximately halfway between the two system outputs. Two gravity-fed water pipelines would be connected to the 42-inch pipeline at the valve vault, as shown in Figure 2-5. Because the 42-inch pipeline is not in use, water supply to the Hatchery would not be disrupted during construction. The auxiliary flow system would be a nonconsumptive use of water; the diverted water would return to the lower American River at the fish passageway entrance. No procurement or water supply contract would be required (Robinson 2009c). Impacts would be negligible because the lower American River water supply would not be affected, and capacity is available.

Wastewater infrastructure would not be required or impacted. The project would not generate wastewater. No impacts on wastewater are anticipated.

Electricity. Up to 40 cfs would be directed through the auxiliary pipelines to achieve the correct depth and flow rate in the fish passageway. Diverting water to the auxiliary pipelines would temporarily and incrementally reduce the energy generated at the Nimbus power plant. However, because removing the weir would incrementally increase the energy generated at the plant, impacts would be less than significant.

Stormwater. Permanent changes to stormwater infrastructure would not be required. Stormwater would continue to follow surface topography and either percolate into the ground or run into the lower American River. Stormwater would be managed in compliance with all applicable federal, state, county, and municipal laws, ordnances, and regulations. Stormwater BMPs would be implemented during construction to prevent erosion and the introduction of polluted runoff to the lower American River. Stormwater BMPs would include the following:

- Protect storm drain inlets and surface water bodies from sediment and other materials in stormwater discharges.
- Install sediment, erosion, and runoff controls, such as silt fences, sand bags, and fiber rolls before ground-disturbing activities begin; maintain these controls and install additional controls as needed during construction.
- Use stabilized construction entrances, sweeping, or vacuuming of sediment tracked onto public roads by vehicles.
- Protect soil stockpiles from wind, rain, and other weather by covering, watering, moving, and containing.
- Apply soil stabilization measures, such as covering and watering all disturbed areas.
- Apply final stabilization measures, such as seeding, mulching, sodding, landscaping, and installing riprap, and restore the construction area at project completion to prevent stormwater contamination.

Solid Waste. Construction would generate solid waste, especially metal and concrete debris from removing the weir. Solid waste would be managed in compliance with all applicable federal, state, county, and municipal laws, ordinances, and regulations. Construction debris would be transported by a licensed waste hauler to the Kiefer Landfill or the North Area Recovery Station for disposal. Both landfills have sufficient capacity to accept the waste that would be generated by the proposed project, so there would be no impacts. Some rocks may be reused on-site, if appropriate.

Litter would continue to require periodic removal from Nimbus Shoals. The additional attraction of the fish passageway could result in an incremental increase in the amount of litter discarded in the area due to increased visitors to the area. Hatchery personnel would assist CDPR with litter removal if necessary, so impacts would be less than significant (Robinson 2009d).

Public Services

Fire and Medical Services. Metro Fire has sufficient personnel and capacity to serve its jurisdiction, which includes the project area. There are multiple local medical facilities in the vicinity, which would have sufficient capacity to serve the project area. Fire and medical emergencies may occur during site construction, but by observing safe work practices, few if any emergencies would likely occur, so impacts would be negligible.

Security and Law Enforcement. CDFG wardens patrol the project area and issue citations for any illegal fishing. New areas that would be closed to fishing under Alternative 1A are the fish passageway and within a 250-foot radius from the passageway entrance. In addition to regular CDFG and CDPR patrols, visits to the fish passageway by the public and Hatchery personnel would be high when fish were in the passageway, which would discourage illegal fishing. In addition, fencing would be placed on top of the flume section. Incidences of vandalism, illegal parking, and off-road vehicle use in the rock channel portion of the fish passageway would likely increase, commensurate with the increased number of visitors at the shoals. Although these incidents and the number of citations could increase, existing patrols would likely provide sufficient law enforcement. Therefore, impacts would be less than significant.

No phase of the proposed project would interfere with Sacramento County's Emergency Response Plan (County of Sacramento, Emergency Operations Office 2008) or Evacuation Plan (James Lee Witt Associates 2008). The design and implementation of the proposed project would be consistent with the relevant policies concerning emergency access, management, and response in the American River Parkway Plan (County of Sacramento, Planning and Community Development Department 2008). For example, structures and access roads would be designed and constructed such that adequate emergency services could be provided and emergency vehicle access would be accommodated at all public vehicle access points. Therefore, no impacts would occur.

Schools, Parks, and Recreation Areas. Construction at the project area would require handling hazardous materials and waste within one-quarter mile of the Aquatic Center, a facility associated with the CSUS. As discussed in Section 3.8, the nearest school serving minors (children under the age of 18) is approximately one mile north of the project area. Because the Aquatic Center does not use Nimbus Shoals or the project area and is separated from the project area by a steep incline, no impacts would occur.

Vehicle and pedestrian access to Nimbus Shoals would be restricted or otherwise controlled as needed during construction to ensure public safety. These restrictions would be temporary and therefore less than significant. The bicycle trail would be realigned slightly, but the new alignment would not differ significantly from the existing alignment, so impacts would be less than significant.

Transportation and Traffic

Construction. The estimated maximum daily truck trips and worker commute trips that would be required during construction are shown in Tables 4-2 and 4-3. Most of the vehicles would be northbound on Hazel Avenue. Vehicles would turn both directions onto Gold Country Boulevard to access either Nimbus Shoals or the staging area in the Hatchery parking lot. The maximum daily trips would be less than one percent of 2008 traffic counts on roads in the project area, so no significant delays would occur. No road or lane closures would be required during construction.

Table 4-2. New Fish Passageway Construction Trips, Alternative 1A

Construction Phase*	Daily Truck Trips		Daily Worker Commute Trips	
	One-Way Trips	Round-Trips	One-Way Trips	Round-Trips
Excavation	7	3.5	40	20
Concrete work	7	3.5	32	16
Rock channel	10	5	40	20
Other features	3	1.5	36	18
Maximum per day	10	5	40	20

*Phases would not overlap
Source: Tetra Tech staff analysis

Table 4-3. Existing Weir Removal Trips, Alternative 1A

Construction Phase*	Daily Truck Trips		Daily Worker Commute Trips	
	One-Way Trips	Round-Trips	One-Way Trips	Round-Trips
Rock removal	20	10	20	10
Sheet pile removal	2	1	20	10
Pier removal	2	1	20	10
Maximum per day	20	10	20	10

*Phases would not overlap
Source: Tetra Tech staff analysis

Construction equipment would cross the bicycle trail at the entrance to the Hatchery and the entrance to Nimbus Shoals. The bicycle trail would be closed for brief periods or would be rerouted to reduce conflicts between cyclists and construction equipment. Impacts on bicycle access would be less than significant because they would be temporary and would be managed to ensure the safety of cyclists and construction workers.

Under Alternative 1A, short-term effects on the public's ability to park at the Hatchery and Nimbus Shoals would occur. Construction staging for the new fish passageway would occur on the Hatchery parking lot. The staging area would encompass approximately four acres, which would require closing part of the Hatchery parking lot and removing roughly 65 parking spaces. This section of the Hatchery parking lot would be closed for about eight months during the first year of construction for the new fish passageway. Approximately two to three years later, this area of the Hatchery parking lot would be closed again from May to September during weir removal. The parking on Nimbus Shoals is uncontrolled and would be affected during construction of the fish passageway. Temporary closures during construction would occur; impacts would be less than significant.

Operation and Maintenance. Additional vehicle trips to the fish passageway would occur. Vehicle trips for inspecting, maintaining, and patrolling would not likely exceed five trips per day. Public visitation of the fish passageway would be minimal when fish were not in the passageway. During October and November, the height of spawning season, additional vehicle trips to Nimbus Shoals could reach 200 per day. Visitors, especially registered groups, would be encouraged to park in the Hatchery parking lot and walk along the fish passageway via the existing American River Parkway Jedediah Smith Memorial Trail to reduce the number of vehicles driving to and parked at Nimbus Shoals. Approximately 740 people visited the Hatchery each day during October and November of 2007 (CDFG 2008a). The level of visitation would likely be similar, and impacts on traffic could be reduced because this visitation would be distributed between the Hatchery and the fish passageway at Nimbus Shoals, rather than concentrated exclusively at the Hatchery. Although traffic delays could occur along the access road to Nimbus Shoals and because of limited parking at Nimbus Shoals, significant delays would not be likely on roads in the project area. Therefore, impacts would be less than significant

Visitor Management Options for Nimbus Shoals

<u>*Public Vehicle Access with Defined Parking*</u>

There would be no impacts on utilities. The only impact on public services would be related to security and law enforcement. Incidences of vandalism, illegal parking, illegal fishing, and off-road vehicle use in the rock channel portion of the fish passageway would likely increase, commensurate with the increased number of recreationists at the shoals. Although these incidents and the number of citations could increase, existing patrols would likely provide sufficient law enforcement. Therefore, impacts would be less than significant. Impacts on transportation and traffic would be less than significant because the defined parking area would provide sufficient parking for the anticipated numbers of visitors to the shoals.

<u>*Walk-in Only (No Public Vehicle) Access*</u>

There would be no impacts on utilities. The only impact on public services would be related to security and law enforcement. Incidences of vandalism and illegal fishing would likely occur at the shoals, but existing patrols would likely provide sufficient law enforcement. The need for law enforcement to control vandalism and vehicle break-ins would shift to nearby parking areas, but existing patrols would likely be sufficient; therefore, impacts would be less than significant. Transportation and traffic impacts would be less than significant because there is sufficient parking nearby for the anticipated numbers of visitors to the shoals.

<u>*No Public Access*</u>

There would be no impacts on utilities or transportation and traffic. The only impact on public services is related to security and law enforcement. Although the area would be fenced to prevent public access, an increase in law enforcement would be necessary to maintain the closure. Because multiple agencies provide law enforcement for the project area and would likely have capacity to incrementally increase enforcement, impacts would be less than significant.

4.9.2 Alternative 1C

Impacts on utilities and transportation and traffic are the same as those described under Alternative 1A.

Impacts on public services are similar to those described under Alternative 1A. Increased enforcement of the fishing closure may be temporarily necessary as anglers become accustomed to the regulation change. Patrols would likely remain at current levels. Signs could be used to inform anglers about the regulation change. In general, anglers would be expected to respect the regulation change and to observe the fishing closure. Therefore, additional patrols would not be required, and impacts would be less than significant.

4.9.3 Alternative 2

Utilities

Impacts would be less than significant and are similar to those described under Alternative 1A. No impacts would occur related to water and electricity since the auxiliary water system would not be constructed.

Public Services

Impacts would be less than significant and similar to those described under Alternative 1A. The fish-tight weir would reduce fishing opportunities in Nimbus Shoals, which could reduce recreation use of Nimbus Shoals, potentially reducing law enforcement needs in this area.

Transportation and Traffic

Construction. The estimated maximum daily truck trips and worker commute trips that would be required during construction are shown in Tables 4-4 and 4-5. Most of the vehicles would be northbound on Hazel Avenue. All vehicles would turn toward the Hatchery on Gold Country Boulevard to access the staging area. Although the number of trips would be higher than under Alternative 1A or 1C, the maximum daily trips would remain less than one percent of 2008 traffic counts on roads in the project area, so no significant delays would occur. No road or lane closures would be required.

Table 4-4. New Weir Construction Trips, South Half, Alternative 2

Construction Phase	Daily Truck Trips		Daily Worker Commute Trips	
	One-Way Trips	Round-Trips	One-Way Trips	Round-Trips
Coffer dam	8	4	24	12
Old weir removal	10	5	24	12
New weir construction	22	11	44	22
Maximum per day	32	16	68	34

Note: Removing the weir would overlap with constructing the new weir for approximately one month.
Source: Tetra Tech staff analysis

Table 4-5. New Weir Construction Trips, North Half, Alternative 2

Construction Phase	Daily Truck Trips		Daily Worker Commute Trips	
	One-Way Trips	Round-Trips	One-Way Trips	Round-Trips
Coffer dam	8	4	24	12
Old weir removal	10	5	24	12
New weir construction	28	14	44	22
Maximum per day	38	19	68	34

Note: Removing the weir would overlap with constructing the new weir for approximately one month.
Source: Tetra Tech staff analysis

Temporary construction-related impacts on parking and bicycle and pedestrian access would be less than those described in Alternative 1A due to the smaller construction footprint. Vehicle access to Nimbus Shoals would not be impacted. Impacts would remain less than significant.

Operation and Maintenance. The replacement weir would be maintained by local Hatchery personnel and would not generate additional vehicle trips on roads in the project area; no impacts would occur.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

There would be no impacts on utilities. Enforcement issues, such as illegal parking and vandalism, would decrease with decreased visitor numbers and existing patrols would likely provide sufficient law enforcement; therefore, there would be no adverse impact. Impacts on transportation and traffic would be less than significant because the defined parking area would provide sufficient parking for the anticipated numbers of visitors to the shoals.

Walk-in Only (No Public Vehicle) Access

There would be no impacts on utilities. Enforcement issues, such as vandalism, would decrease with decreased visitor numbers. Visitor numbers may decrease even further due to visitors being unwilling to walk to the area. Due to reduced visitor numbers, existing patrols would likely provide sufficient law enforcement, and there would be no adverse impact. Parking would shift from the shoals to the Hatchery parking lot, the CSUS parking lot, nearby streets, and other nearby parking areas. The resulting transportation and traffic impacts would be less than significant because there is sufficient parking in these areas for the anticipated numbers of visitors to the shoals.

No Public Access

There would be no impacts on utilities or transportation and traffic. The area would be fenced to prevent public access. Although patrols would be required to maintain the closure, the reduced number of fish in the stilling basin would reduce public desire to visit the shoals. Therefore, existing patrols would likely provide sufficient law enforcement and there would be no adverse impact.

4.9.4 No Action Alternative

The No Action Alternative would not require construction or other activities in the project area and so would not impact utilities, public services, traffic, or transportation. Solid waste, primarily trash discarded by recreation users of the area, would continue to be deposited in the project area, would become lodged on the weir, and would continue to require removal.

4.10 Energy

The effect on tailrace water surface elevations for the various alternatives is discussed in Section 4.6, Water Resources. Reclamation estimates that one foot of head differential between Lake Natoma and the tailrace is equivalent to a change of about 1.75 GWh per year, or 146 megawatt-hours (MWh) per month. On an annual average, Reclamation estimates the market value of electrical energy produced to be about $50.00 per MWh.

4.10.1 Alternative 1A

During construction, the water level in the river may need to be reduced for a limited time while the weir is being removed for the safety of construction crews and equipment. The flow rate needed to reduce the water level to the appropriate level would involve a reduction in water flow to about 1,000 cfs during these activities. The activities requiring the reduction in flow are estimated to take approximately one week. The power generation would be reduced during this short period.

The new fish passageway would require flows sufficient for fish attraction and adequate depth for operation. Design flow for the flume and fish ladder sections call for supplemental water supplies of up to 40 cfs around Nimbus Dam to attract fish to the passageway entrance while the fish ladder is operating (from approximately mid-November through April). This flow would bypass the flow through the power plant but would still count as part of the total water released from the Nimbus Dam into the American River.

When the total water released to the American River falls below 5,000 cfs, this diversion around the dam would reduce the water flow through the power plant and would reduce the power generated when the fish ladder is operating. The power reduction is estimated to be about 350 MWh per year (0.0022 MW/cfs $\times$ 40 cfs $\times$ 166 days $\times$ 24 hours/day), assuming the fish ladder operates from mid-November until the end of April.

On average, during the months that the fish ladder is operating, Nimbus releases are at or below 5,000 cfs about 81 percent of the time (50 percent exceedance); therefore, the power foregone would average about 284 MWh per year. At $50/MWh, the value of that power would be $14,200 per year.

However, under Alternative 1A, the weir would be removed, lowering the elevation of the tailrace. This lower elevation would increase the power production to about 3,723 MWh per year, valued at about $186,150. The net impact on energy production is a gain valued at $171,950 per year.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

The energy production of the power plant is not related to visitor use of Nimbus Shoals; therefore, there would be no impact.

Walk-in Only (No Public Vehicle) Access

The energy production of the power plant is not related to visitor use of Nimbus Shoals; therefore, there would be no impact.

No Public Access

The energy production of the power plant is not related to visitor use of Nimbus Shoals; therefore, there would be no impact.

4.10.2 Alternative 1C

The impacts are the same as described for Alternative 1A above.

4.10.3 Alternative 2

Under Alternative 2, no water would be diverted around the dam, so the flow would not be reduced through the power plant. Alternative 2 would also modify the surface water elevation in the tailrace of Nimbus Dam. This change in elevation would result in a gain of about 584 MWh, valued at about $29,200 per year.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

As described under Alternative 1A, there would be no impact.

Walk-in Only (No Public Vehicle) Access

As described under Alternative 1A, there would be no impact.

No Public Access

As described under Alternative 1A, there would be no impact.

4.10.4 No Action Alternative

Currently, Reclamation and Hatchery personnel must enter the water to install and remove the weir superstructure and to make any necessary repairs. During these repairs, river flows must be lowered to approximately 1,000 to 1,500 cfs for safety when personnel are working in the water. River flows must be lowered even further if major repairs are needed and heavy equipment must enter the water, or if problems are encountered during installation. The duration of the flow reductions has ranged from less than one hour, under the best conditions, to five days, when significant flow during the previous winter had scoured the foundation of the structure, and major repairs were required. Water flow through the power plant is reduced during these repairs, and power generation is commensurately reduced. Weir removal generally does not require reducing river flows.

There would be no impacts on energy from the No Action Alternative.

4.11 Air Quality

Sacramento County is a nonattainment area for three federal air quality standards—ozone, PM_{10}, and $PM_{2.5}$—and a federal maintenance area for carbon monoxide. Sacramento County also is a nonattainment area for three state air quality standards: ozone, PM_{10}, and $PM_{2.5}$. Ozone is a secondary pollutant formed from chemical reactions between organic compounds and nitrogen oxides in the presence of sunlight. The time required for these chemical reactions allows emissions to be dispersed and transported over fairly large distances. Consequently, there is a regional area of influence for ozone impacts. Directly emitted particulate matter emissions (PM_{10} and $PM_{2.5}$) are dominated by solid and liquid aerosols that generally have relatively low chemical reactivity. Consequently, the region of influence for direct particulate matter emissions is localized and depends on the magnitude and spatial concentration of emissions and on meteorological conditions. For construction-related activities, the region of influence for directly emitted particulate matter emissions is typically within one mile of the construction site. Carbon monoxide is a directly emitted gaseous pollutant produced by fuel combustion sources. The region of influence for carbon monoxide emissions is localized and seldom extends more than half a mile from the emission source.

CAA conformity emission thresholds applicable to the alternative projects are 50 tons per year for reactive organic compound emissions, 50 tons per year for nitrogen oxide emissions, 100 tons per year for carbon monoxide, 100 tons per year for PM_{10}, and 100 tons per year for $PM_{2.5}$. In addition, the SMAQMD has adopted an impact significance threshold of 85 pound per day for nitrogen oxide emissions from construction. The SMAQMD has not established emissions significance levels for other air pollutants from construction. Instead, SMAQMD uses ambient air quality increments of five percent of the relevant state ambient air quality standard as significance thresholds for carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, PM_{10}, $PM_{2.5}$, sulfates, hydrogen sulfide, and vinyl chloride (SMAQMD 2009).

Air pollutant emissions associated with the project alternatives would be generated by construction. The operation of the Hatchery would not significantly change from current conditions under any of the alternatives. Construction emissions have been estimated using a detailed spreadsheet model (CNSTEMIS) that is easily customized to address any type of construction or demolition activity. The CNSTEMIS estimates criteria pollutant and greenhouse gas pollutant emissions from on-site construction and demolition. Appendix D provides an overview of the CNSTEMIS model. Emissions from construction-related off-site truck traffic and construction worker commute traffic have been estimated using the URBEMIS2007 model (Jones and Stokes Associates 2007).

4.11.1 Alternative 1A

As indicated by the analyses described below, air quality impacts for Alternative 1A would be less than significant.

Construction Details

This analysis assumed that construction of Alternative 1A would involve constructing a new fish passageway as early as 2011 and removing the weir as early as 2013, after there has been an opportunity to ensure that the new fish passageway is functioning properly. Construction generally would start in the spring and be finished by the fall. Any in-river work would occur between June and September.

Construction in 2011 was evaluated in terms of four activity phases:

- Excavating the flume and fish ladder features of the fish passageway;
- Installing concrete to complete the flume and fish ladder components;
- Constructing the rock-lined channel feature, including a temporary berm in the river at the channel entrance, dewatering the bermed area, excavating the channel, and placing the rock lining for the channel; and
- Constructing other features, such as the channel gate, auxiliary water supply well, and associated pipelines.

Each of these construction phases was assumed to occur in sequence, with no overlap among phases. The 2011 construction was assumed to require 97 days between April and September. Excavation quantities were estimated at 1,744 cubic yards for the flume and fish ladder sections and 1,280 cubic yards for the rock-lined channel section. Concrete work, which would require vehicles to cross the flume and perhaps a viewing pad area in the Hatchery, was assumed to require 500 cubic yards of concrete. The rock-lined channel was assumed to require 300 cubic yards of rock. A total of 7.1 acres (including access roads and staging areas) would be subject to disturbance at various times, although only a portion of this area would be affected at any one time. The project area is primarily old dredge tailings material. The sediment content of this material was treated as loamy sand for purposes of estimating fugitive dust generation.

Construction during 2011 was estimated to require 696 off-site truck trips (one-way travel events) and 3,644 construction worker commute trips (one-way travel). Annual off-site vehicle travel would be 10,440 vehicle miles traveled (VMT) by heavy trucks and 54,660 VMT by construction workers. The off-site truck trips were assumed to be 30 percent light-heavy trucks (five-ton payload), 53.3 percent medium-heavy trucks (12-ton payload), and 16.7 percent heavy-heavy trucks (25-ton payload). These truck percentages were computed from the URBEMIS2007 default vehicle mix for Sacramento County in 2011. The default URBEMIS2007 fuel mix was used for light-heavy trucks and heavy-heavy trucks. The URBEMIS2007 default fuel mix was changed to 100 percent diesel for medium-heavy trucks. Off-site heavy truck emissions assumed a one-way trip distance of 15 miles (the URBEMIS2007 default for rural parts of Sacramento County) and an average trip speed of 45 mph. The off-site worker commute trips were assumed to be 26.4 percent light-duty autos, 17.2 percent light-duty trucks (half-ton payload), 38.8 percent light-duty trucks (one-ton payload), and 17.6 percent medium-duty trucks (two-ton payload). These vehicle percentages were computed from the URBEMIS2007 default vehicle mix for Sacramento County in 2011. Off-site worker commute emissions assumed a one-way trip distance of 15 miles (the URBEMIS2007 default for rural parts of Sacramento County) and an average trip speed of 45 mph.

Construction in 2013 would involve removing the weir. These activities were evaluated in terms of three activity phases:

- Removing rock fill upstream of the weir;
- Removing the weir sheet pilings; and
- Cutting the support piers.

The 2013 construction was assumed to occur from June through August. Each of these construction phases was assumed to occur in sequence, with no overlap among phases. The 2011 construction was assumed to require 67 construction days. The amount of rock fill to be removed was estimated at 2,641 cubic yards. Approximately half an acre of onshore land was assumed to be disturbed by truck and equipment movements during each phase of the 2013 construction. Some of the rock removed during 2013 may be redistributed on the river bed, and some may be removed to off-site storage areas for reuse on other projects. As a conservative analysis, all rock was assumed to be removed from the project area.

Construction during 2013 was estimated to require 686 off-site truck trips (one-way travel events) and 1,340 construction worker commute trips (one-way travel events). Annual off-site vehicle travel would be 10,290 VMT by heavy trucks and 20,100 VMT by construction workers. The off-site truck trips were assumed to be 30 percent light-heavy trucks (five-ton payload), 53.3 percent medium-heavy trucks (12-ton payload), and 16.7 percent heavy-heavy trucks (25-ton payload). These truck percentages were computed from the URBEMIS2007 default vehicle mix for Sacramento County in 2013. The default URBEMIS2007 fuel mix was used for light-heavy trucks and heavy-heavy trucks. The URBEMIS2007 default fuel mix was changed to 100 percent diesel for medium-heavy trucks. Off-site heavy truck emissions assumed a one-way trip distance of 15 miles (the URBEMIS2007 default for rural parts of Sacramento County) and an average trip speed of 45 mph. The off-site worker commute trips were assumed to be 26.3 percent light-duty autos, 17.2 percent light-duty trucks (half-ton payload), 38.9 percent light-duty trucks (one-ton payload), and 17.6 percent medium duty trucks (two-ton payload). These vehicle percentages were computed from the URBEMIS2007 default vehicle mix for Sacramento County in 2013. Off-site worker commute emissions assumed a one-way trip distance of 15 miles (the URBEMIS2007 default for rural parts of Sacramento County) and an average trip speed of 45 mph.

Daily Emissions

Table 4-6 is a summary of the average daily emissions of criteria pollutants from construction for Alternative 1A. Emissions for each phase of activity include on-site construction equipment and activities, off-site travel by construction-related trucks, and off-site travel by construction workers.

Table 4-6. Summary of Daily Criteria Pollutant Emissions for Alternative 1A

Year	Construction Phase	Daily Emissions by Phase, Pounds per Day						
		ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	DPM
2011	Excavation	2.5	15.9	15.5	0.6	2.8	1.3	1.0
	Concrete work	1.5	7.2	12.6	0.3	2.3	0.9	0.5
	Rock channel	2.6	15.3	17.2	0.4	2.4	1.1	0.9
	Other features	2.3	10.3	14.1	0.2	2.2	0.9	0.5
	Maximum Daily Emissions	**2.6**	**15.9**	**17.2**	**0.6**	**2.8**	**1.3**	**1.0**
	SMAQMD threshold	NA	85	NA	NA	NA	NA	NA
	Over SMAQMD threshold?	No	No	No	No	No	No	No
2013	Rock removal	2.2	17.2	16.7	0.8	4.2	2.2	1.7
	Sheet pile removal	1.4	9.5	11.6	0.5	3.1	1.6	1.0
	Pier removal	1.3	7.7	10.4	0.3	3.4	1.8	1.3
	Maximum Daily Emissions	**2.2**	**17.2**	**16.7**	**0.8**	**4.2**	**2.2**	**1.7**
	SMAQMD threshold	NA	85	NA	NA	NA	NA	NA
	Over SMAQMD threshold?	No	No	No	No	No	No	No

Notes:

ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides:
PM_{10} = inhalable particulate matter
$PM_{2.5}$ = fine particulate matter
DPM = diesel particulate matter
NA = not applicable (no significance threshold has been established)
Emissions include on-site equipment and activities, off-site truck travel, and off-site worker commute travel.
Construction phases would not overlap in 2011 or 2013.

Source: Tetra Tech analyses.

As shown in Table 4-6, daily emissions of nitrogen oxides would be well below the SMAQMD impact significance threshold during all phases of construction and weir removal. Daily emission quantities for all pollutants are clearly too low to generate significant ambient concentration increments, so there was no need to perform any dispersion modeling studies for construction site or off-site highway emissions. Daily emissions of criteria pollutants under Alternative 1A would be less than significant.

Annual Emissions

Table 4-7 is a summary of the annual emissions of criteria pollutants from construction under Alternative 1A. Emissions for each phase of activity include on-site construction equipment and activities, off-site travel by construction-related trucks, and off-site travel by construction workers.

Table 4-7 Summary of Annual Criteria Pollutant Emissions for Alternative 1A

Year	Construction Phase	Annual Emissions by Phase, Tons per Year						
		ROG	**NOx**	**CO**	**SOx**	**PM_{10}**	**$PM_{2.5}$**	**DPM**
2011	Excavation	0.038	0.239	0.232	0.010	0.042	0.020	0.015
	Concrete work	0.017	0.079	0.139	0.003	0.026	0.010	0.006
	Rock channel	0.039	0.230	0.258	0.006	0.036	0.016	0.013
	Other features	0.017	0.077	0.106	0.001	0.016	0.007	0.004
	Annual Emissions	**0.110**	**0.625**	**0.734**	**0.020**	**0.120**	**0.052**	**0.037**
	CAA conformity threshold	50	50	100	NA	100	100	NA
	Over conformity threshold?	No	No	No	No	No	No	No
2013	Rock removal	0.033	0.259	0.250	0.012	0.062	0.033	0.025
	Sheet pile removal	0.016	0.105	0.128	0.005	0.034	0.017	0.011
	Pier removal	0.010	0.058	0.078	0.002	0.025	0.014	0.010
	Annual Emissions	**0.059**	**0.421**	**0.456**	**0.020**	**0.121**	**0.064**	**0.046**
	CAA conformity threshold	50	50	100	NA	100	100	NA
	Over conformity threshold?	No	No	No	No	No	No	No

Emissions include on-site equipment and activities, off-site truck travel, and off-site worker commute travel.
Source: Tetra Tech analyses.

As indicated in Table 4-7, emissions of ozone precursors, suspended particulate matter, and carbon monoxide would be far below the relevant CAA conformity thresholds.

Consequently, annual emissions of criteria pollutants under Alternative 1A would be less than significant.

Greenhouse Gas Emissions

Table 4-8 is a summary of the annual emissions of greenhouse gas pollutants from construction for Alternative 1A. Emissions for each phase of activity include on-site construction equipment and activities, off-site travel by construction-related trucks, and off-site travel by construction workers.

Table 4-8. Summary of Annual Greenhouse Gas Emissions for Alternative 1A

Year	Construction Phase	Annual GHG Emissions, Tons per Year			
		CO2	CH4	N2O	CO2e
2011	Excavation	33.9	0.002	0.002	34.4
	Concrete work	15.8	0.001	0.001	16.3
	Rock channel	37.3	0.002	0.002	37.8
	Other features	13.4	0.001	0.001	13.6
	Annual Emissions	**100.4**	**0.006**	**0.005**	**102.2**
2013	Rock removal	48.4	0.002	0.002	49.0
	Sheet pile removal	20.7	0.001	0.001	20.9
	Pier removal	11.6	0.000	0.000	11.7
	Annual Emissions	**80.7**	**0.004**	**0.003**	**81.6**

Notes:

GHG = greenhouse gas
CO2 = carbon dioxide (GWP multiplier = 1)
CH4 = methane (GWP multiplier =25)
N2O = nitrous oxide (GWP multiplier = 298)
GWP = global warming potential in carbon dioxide equivalents, based on IPCC 2007 data, 100-year time frame (IPCC 2007)
CO2e = carbon dioxide equivalents
Emissions include on-site equipment and activities, off-site truck travel, and off-site worker commute travel.

Source: Tetra Tech analyses.

Federal, state, and local agencies have not yet adopted numerical significance criteria for GHG emissions. However, CARB has adopted mandatory GHG emissions reporting requirements for stationary emission sources, which provide a context for judging the relative significance of project-related GHG emissions. The threshold for mandatory reporting of GHG emissions from sources other than power plants and cogeneration facilities is 27,558 tons per year (25,000 metric tons) of carbon dioxide emissions. The reporting threshold for power plants and cogeneration facilities is 2,756 tons per year (2,500 metric tons) of carbon dioxide emissions. As shown in Table 4-8, the GHG emissions for Alternative 1A are far below any of the mandatory reporting thresholds for stationary sources.

Current GHG emissions from sources in Sacramento County provide an additional context for judging the relative significance of project-related GHG emissions. Annual GHG emissions from sources in Sacramento County have been estimated at 15,364,607 tons per year for 2005 (County of Sacramento, DERA 2009b).

Maximum annual GHG emissions from Alternative 1A would be about 102 tons per year of carbon dioxide equivalents. This value is far below the most stringent GHG reporting threshold for stationary sources and is only 0.0007 percent of existing Sacramento County GHG emissions. Consequently, GHG emissions from Alternative 1A would be a less than significant air quality impact.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Providing public access to Nimbus Shoals with a defined parking area would require some minor additional construction for grading and preparing the unpaved parking area and other possible visitor facilities, such as picnic table areas, sanitation facilities, and information and educational signs. The amount of construction required for these facilities would be relatively small compared to that addressed above for the main project features under Alternative 1A. Consequently, visitor management options providing public access to Nimbus Shoals with a defined parking area is not expected to have significant air quality impacts.

Walk-in Only (No Public Vehicle) Access

Providing public access to Nimbus Shoals as walk-in access only would require minimal additional construction for fencing, pedestrian/bicycle pathways, and other possible visitor facilities, such as picnic table areas, sanitation facilities, and information and educational signs. The amount of construction required for these facilities would be very small compared to that addressed above for the main project features under Alternative 1A. Consequently, visitor management options providing walk-in public access to Nimbus Shoals are not expected to have significant air quality impacts.

No Public Access

Eliminating public access to Nimbus Shoals would require minimal additional construction for fencing or other access restriction facilities. The amount of construction required for these facilities would be very small compared to that addressed above for the main project features under Alternative 1A. Consequently, visitor management options providing walk-in public access to Nimbus Shoals are not expected to have significant air quality impacts.

4.11.2 Alternative 1C

Alternative 1C differs from Alternative 1A only in terms of fishing restrictions on the American River. Differences in fishing restrictions would not alter any of the construction activities, as analyzed for Alternative 1A, so air quality impacts under Alternative 1C are the same as those described for Alternative 1A. Alternative 1C would have a less than significant impact on air quality.

4.11.3 Alternative 2

As indicated by the analyses described below, air quality impacts for Alternative 2 would be less than significant.

Construction Details

Construction of Alternative 2 would involve removing the weir and constructing a new weir upstream. This analysis assumed that construction could begin as early as 2011 and occur in 2011 and 2012 but would be limited to June through September. Temporary cofferdams would be required to allow construction equipment on the riverbed. Analyses assumed that an impervious membrane type of cofferdam would be used since it does not make economic or environmental sense to install and then remove sheet pile type cofferdams for a four-month construction season. Activities during 2011 include removing the south half of the weir and constructing the south half of the new weir. Activities during 2012 include removing the north half of the weir and constructing the north half of the new weir.

Construction activities in 2011 were evaluated in terms of three phases:

- Installing a temporary cofferdam;
- Removing the south half of the existing weir; and
- Constructing the south half of the new weir.

Removing the south half of the weir would partially overlap with construction of the south half of the new weir. The 2011 construction activities were assumed to require 82 construction days, from June through September. Equipment use for removing the south half of the weir was based on half of the values generated for the 2013 weir removal phase under Alternative 1A. Construction of the south half of the new weir was estimated to require 8,233 cubic yards of concrete. Approximately half an acre of onshore land was assumed to be disturbed by truck and equipment movements during each phase of the 2011 construction activity. The project area is primarily old dredge tailings. The sediment content of this material was treated as loamy sand for purposes of estimating fugitive dust generation.

Construction during 2011 was estimated to require 1,750 off-site truck trips (one-way travel events) and 3,696 construction worker commute trips (one-way travel events). Annual off-site vehicle travel would be 26,250 VMT by heavy trucks and 55,440 VMT by construction workers. Heavy truck and construction worker vehicle mixes, vehicle fuel types, one-way trip lengths, and average trip speeds for Alternative 2 were the same as those assumed for 2011 truck and worker travel under Alternative 1A.

Construction in 2012 would involve the following three phases:

- Installing a temporary cofferdam;
- Removing the north half of the existing weir; and
- Constructing the north half of the new weir.

The 2012 construction activities were assumed to occur from June through September. Removing the north half of the weir would partially overlap with construction of the north half of the new weir. The 2012 construction activities were assumed to require 82 construction days. Equipment use for removing the north half of the weir was based on half of the values generated for the 2013 weir removal phase under Alternative 1A. Constructing the north half of the new weir was estimated to require 10,833 cubic yards of concrete. The north half of the new weir would require more concrete than the south half, since all bypass gates are in the south half of the new weir. Approximately half an acre of onshore land was assumed to be disturbed by truck and equipment movements during each phase of the 2012 construction activity.

Construction during 2012 was estimated to require 2,110 off-site truck trips (one-way travel events) and 3,696 construction worker commute trips (one-way travel events). Annual off-site vehicle travel would be 31,653 VMT by heavy trucks and 55,440 VMT by construction workers. The off-site truck trips were assumed to be 30 percent light-heavy trucks (five-ton payload), 53.3 percent medium-heavy trucks (12-ton payload), and 16.7 percent heavy-heavy trucks (25-ton payload). These truck percentages were computed from the URBEMIS2007 default vehicle mix for Sacramento County in 2012. The default URBEMIS2007 fuel mix was used for light-heavy trucks and heavy-heavy trucks. The URBEMIS2007 default fuel mix was changed to 100 percent diesel for medium-heavy trucks. Off-site heavy truck emissions assumed a one-way trip distance of 15 miles (the URBEMIS2007 default for rural parts of Sacramento County) and an average trip speed of 45 mph. The off-site worker commute trips were assumed to be 26.3 percent light-duty autos, 17.2 percent light-duty trucks (half-ton payload), 38.9 percent light-duty trucks (one-ton payload), and 17.6 percent medium-duty trucks (two-ton payload). These vehicle percentages were computed from the URBEMIS2007 default vehicle mix for Sacramento County in 2012. Off-site worker commute emissions assumed a one-way trip distance of 15 miles (the URBEMIS2007 default for rural parts of Sacramento County) and an average trip speed of 45 mph.

Daily Emissions

Table 4-9 is a summary of the average daily emissions of criteria pollutants from construction activities for Alternative 2. Emissions for each phase of activity include on-site construction equipment and activities, off-site travel by construction-related trucks, and off-site travel by construction workers.

Table 4-9. Summary of Daily Criteria Pollutant Emissions for Alternative 2

Year	Construction Phase	Daily Emissions by Phase, Pounds per Day						
		ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	DPM
2011	Cofferdam	1.5	8.1	9.4	0.2	2.8	1.1	0.5
	South half weir removal	2.1	15.8	15.2	0.8	4.0	2.2	1.7
	South half new weir	4.2	26.1	27.7	1.0	5.2	2.7	2.1
	Maximum Daily Emissions	**7.8**	**50.0**	**52.3**	**2.0**	**12.0**	**6.0**	**4.3**
	SMAQMD threshold	NA	85	NA	NA	NA	NA	NA
	Over SMAQMD threshold?	No	No	No	No	No	No	No
2012	Cofferdam	1.5	7.3	9.1	0.2	2.7	1.1	0.4
	North half weir removal	2.0	14.2	14.6	0.7	3.9	2.1	1.5
	North half new weir	4.2	26.6	28.7	0.9	5.4	2.8	2.2
	Maximum Daily Emissions	**7.7**	**48.1**	**52.4**	**1.8**	**12.0**	**6.0**	**4.1**
	SMAQMD threshold	NA	85	NA	NA	NA	NA	NA
	Over SMAQMD threshold?	No	No	No	No	No	No	No

Notes:
Emissions for each phase include on-site equipment and activities, off-site truck travel, and off-site worker commute travel.
Removal of the existing weir would partially overlap with construction of the new weir in 2011 and 2012.

Source: Tetra Tech analyses.

Maximum daily emissions of criteria pollutants would be higher under Alternative 2 than under Alternative 1A. As shown in Table 4-9, daily emissions of nitrogen oxides would be below the SMAQMD impact significance threshold during all phases of construction for Alternative 2. Daily emission quantities for all pollutants are too low to generate significant ambient concentration increments. Consequently, there was no need to perform any dispersion modeling studies for construction site or off-site highway emissions. Daily emissions of criteria pollutants under Alternative 2 are less than significant.

Annual Emissions

Table 4-10 is a summary of the annual emissions of criteria pollutants from construction activities for Alternative 2. Emissions for each phase of activity include on-site construction equipment and activities, off-site travel by construction-related trucks, and off-site travel by construction workers.

Table 4-10. Summary of Annual Criteria Pollutant Emissions for Alternative 2

Year	Construction Phase	Annual Emissions by Phase, Tons per Year						
		ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	DPM
2011	Cofferdam	0.008	0.041	0.047	0.001	0.014	0.005	0.002
	South half weir removal	0.036	0.268	0.258	0.014	0.068	0.037	0.029
	South half new weir	0.127	0.782	0.830	0.029	0.157	0.082	0.064
	Annual Emissions	**0.171**	**1.090**	**1.135**	**0.044**	**0.239**	**0.124**	**0.095**
	CAA conformity threshold	50	50	100	NA	100	100	NA
	Over conformity threshold?	No	No	No	No	No	No	No
2012	Cofferdam	0.007	0.037	0.045	0.001	0.014	0.005	0.002
	North half weir removal	0.034	0.241	0.249	0.012	0.066	0.035	0.026
	North half new weir	0.125	0.799	0.860	0.027	0.163	0.084	0.065
	Annual Emissions	**0.167**	**1.077**	**1.154**	**0.040**	**0.243**	**0.124**	**0.093**
	CAA conformity threshold	50	50	100	NA	100	100	NA
	Over conformity threshold?	No	No	No	No	No	No	No

Emissions for each phase include on-site equipment and activities, off-site truck travel, and off-site worker commute travel.

Source: Tetra Tech analyses.

Maximum annual emissions of criteria pollutants would be higher under Alternative 2 than under Alternative 1. As indicated in Table 4-10, emissions of ozone precursors, suspended particulate matter, and carbon monoxide would be far below the relevant CAA conformity thresholds. Consequently, annual emissions of criteria pollutants under Alternative 2 would be less than significant.

Greenhouse Gas Emissions

Table 4-11 is a summary of the annual emissions of GHG pollutants from construction activities for Alternative 2. Emissions for each phase of activity include on-site construction equipment and activities, off-site travel by construction-related trucks, and off-site travel by construction workers.

Table 4-11. Summary of Annual Greenhouse Gas Emissions for Alternative 2

Year	Construction Phase	Annual GHG Emissions, Tons per Year			
		CO_2	**CH_4**	**N_2O**	**CO_2e**
2011	Cofferdam	7.5	0.000	0.000	7.6
	South half weir removal	41.8	0.002	0.002	42.3
	South half new weir	138.0	0.007	0.006	139.8
	Annual Emissions	**187.3**	**0.009**	**0.008**	**189.7**
2012	Cofferdam	7.5	0.000	0.000	7.6
	North half weir removal	41.8	0.002	0.002	42.3
	North half new weir	153.6	0.008	0.007	155.7
	Annual Emissions	**202.9**	**0.010**	**0.009**	**205.6**

Notes:
Emissions for each phase include on-site equipment and activities, off-site truck travel, and off-site worker commute travel.

Source: Tetra Tech analyses.

As shown in Table 4-11, the GHG emissions for Alternative 2 are far below any of the CARB mandatory reporting thresholds for stationary sources.

Maximum annual GHG emissions from Alternative 2 would be 206 tons per year, carbon dioxide equivalents, about twice the GHG emissions under Alternative 1. Nevertheless, this value is far below the most stringent GHG reporting threshold for stationary sources and is only 0.0013 percent of existing Sacramento County GHG emissions. Consequently, GHG emissions from Alternative 2 would be a less than significant air quality impact.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Providing public access to Nimbus Shoals with a defined parking area would require some minor additional construction for grading and preparing the unpaved parking area and other possible visitor facilities, such as picnic table areas, sanitation facilities, and information and educational signs. The amount of construction required for these facilities would be relatively small compared to that addressed above for the main project features under Alternative 2. Consequently, visitor management options providing public access to Nimbus Shoals with a defined parking area are not expected to have significant air quality impacts.

Walk-in Only (No Public Vehicle) Access

Providing public access to Nimbus Shoals as walk-in access only would require minimal additional construction for fencing, pedestrian/bicycle pathways, and other possible visitor facilities, such as picnic table areas, sanitation facilities, and information and educational signs. The amount of construction required for these facilities would be very small compared to that addressed for the main project features under Alternative 2, above. Consequently, visitor management options providing walk-in public access to Nimbus Shoals are not expected to have significant air quality impacts.

No Public Access

Eliminating public access to Nimbus Shoals would require minimal additional construction for fencing or other access restriction facilities. The amount of construction required for these facilities would be very small compared to that addressed for the main project features under Alternative 2, above. Consequently, visitor management options providing walk-in public access to Nimbus Shoals are not expected to have significant air quality impacts.

4.11.4 No Action Alternative

There would be no new construction activity and no changes in operational procedures at the Hatchery under the No Action Alternative. Consequently, the No Action Alternative would not create any new air quality impacts.

4.12 Noise and Vibration

Noise and vibration impacts associated with the project alternatives would be generated by construction. The operation of the Hatchery would not significantly change from current conditions under any of the alternatives.

Both airborne noise and ground-borne vibrations from construction dissipate fairly rapidly with increasing distance from the noise or vibration source. Consequently, the region of influence for noise and vibration is typically quite localized and seldom extends more than a few thousand feet from the construction site.

The closest residences to the project area are on the north side of the river, across from the Hatchery and along Gold Country Boulevard southwest of the Hatchery. Distances to the closest residences in these two areas are summarized in Table 4-12.

Noise impact significance criteria are based on the county general plan noise element and the county noise ordinance. Land use compatibility criteria included in the noise element of the Sacramento County General Plan and noise standards included in the Sacramento noise ordinance are discussed in Section 3.12. The noise element sets a CNEL level of 60 dBA as the upper limit of acceptable noise level for residential and other noise-sensitive land uses. Construction activity is exempt from the county noise ordinance, as long as the activity is limited to the hours of 6 AM to 8 PM on weekdays and 7 AM to 8 PM on Saturdays and Sundays. Construction equipment operating outside those periods would be subject to the county noise ordinance standards, which set limits for noise affecting residences. The basic noise limits are an L50 (noise level exceeded 50 percent of the time) of 55 dBA during daytime and an L50 of 50 dBA during nighttime. Maximum allowable noise levels under the noise ordinance (for less than one minute in any hour) are 75 dBA during daytime and 70 dBA during nighttime.

Vibration impact significance criteria are based on criteria in the Caltrans vibration guidance manual (Caltrans 2004). Those criteria are presented in Section 3.12. The Caltrans manual provides separate criteria for human response and for cosmetic damage, such as paint or plaster cracking, to buildings from isolated single vibrations and from repeated or continuous vibrations, such as from on-site construction. A vibration level of 0.04 inch per second peak particle velocity (PPV) is characterized as distinctly perceptible for human response. Vibration levels below 0.08 inch per second PPV would not cause cosmetic damage to any type of structure. These vibration levels are used as vibration impact significance criteria for this EIS/EIR.

Table 4-12. Distances Between Project Construction Areas and Nearest Residences

Alternative	Construction Area	Distance to Nearest Residence: North Bank of River Across From Hatchery	Distance to Nearest Residence: Along Gold Country Boulevard
Alternatives 1A and 1C	Flume on hatchery grounds	700 feet	1,085 feet
	Flume at north end of Nimbus Shoals	880 feet	1,330 feet
	Central portion of flume on Nimbus Shoals	1,400 feet	1,035 feet
	West end of fish ladder	1,585 feet	1,165 feet
	West end of rock-lined channel	1,735 feet	1,385 feet
	Gate at east end of rock-lined channel	1,900 feet	1,590 feet
	North abutment of existing weir	320 feet	1,500 feet
	South abutment of existing weir	590 feet	1,275 feet
Alternative 2	North abutment of existing weir	320 feet	1,500 feet
	South abutment of existing weir	590 feet	1,275 feet
	North abutment of new weir	420 feet	1,500 feet
	South abutment of new weir	660 feet	1,260 feet

Noise from construction and demolition has been estimated using a detailed spreadsheet model (CNSTNOIZ), which is structured to provide a separate analysis for each construction or demolition phase. The CNSTNOIZ model has an expandable database of

124 equipment entries, including diesel and gasoline engine-powered equipment, equipment warning devices, and common power tools. Some equipment types have multiple entries to reflect a range of typical engine sizes. The database provides a default reference noise level at 50 feet, the range of reference noise levels expected for the general equipment type, default atmospheric absorption coefficients, and default operating time factors for hours when the equipment is active. The operating time fractions allow for more realistic modeling of noise from intermittent equipment operations. The primary calculation sheet allows users to replace the program default values with project-specific estimates.

The model requires users to specify the number and type of equipment items expected to be active in the same general work area for each hour of a 24-hour cycle, thus allowing realistic calculation of various noise metrics, including hourly average noise levels by time of day, maximum hourly noise levels, average daytime, evening, and nighttime noise levels, 24-hour average noise levels (24-hour Leq), and 24-hour CNEL or Ldn noise levels. The model automatically calculates noise levels at 20 distances from the main activity areas of the construction site (default distances range from 50 feet to 2 miles). The model provides a tabular summary of noise levels at all distances and also provides a chart of noise levels at distances out to 3,000 feet, comparing maximum 1-hour Leq, average daytime Leq, and 24-hour CNEL or Ldn level at each distance. The hourly noise contributions from each type of equipment are available in the primary calculation sheet of the model. Equipment types, numbers, and use hours for the CNSTNOIZ model were consistent with the values used for air pollutant emissions analyses in the CNSTEMIS model.

Ground-borne vibrations from construction have been evaluated using data and analysis procedures developed by Caltrans (2002, 2004) and the Federal Transit Administration (2006). Caltrans (2004) provides equations for estimating vibration levels from various types of construction equipment as a function of substrate type and distance.

4.12.1 Alternative 1A

This analysis assumed Alternative 1A would involve construction of a new fish passageway as early as 2011 and removal of the weir as early as 2013. There would be no construction or demolition in 2012 under Alternative 1A.

Construction Noise

Construction activity in 2011 under Alternative 1A was evaluated in terms of four general construction phases: excavation of the flume and fish ladder, concrete work on the flume and fish ladder, excavation and lining of the rock-lined channel, and installation of other features, such as well and associated pipelines and the channel gate. Excavation of the flume and fish ladder channels involves two types of work: construction of an access road into the Nimbus Shoals area and excavation of the channel areas. Equipment for these two activities would generally be operating in different locations. For noise analysis, excavation of the flume and fish ladder channels was considered a more important noise source than equipment used to construct the access road. Construction of the rock-lined channel would require a berm near the mouth of the channel and dewatering of the area protected by the berm. The berm and dewatering pump would be required for completing the channel entrance, which requires installation of foundations to support a possible future gate structure. The dewatering pump was assumed to run continuously. All other equipment would operate only during normal daytime work hours. Major equipment items assumed for the noise analysis included the following:

- Flume and fish ladder excavation—Wheeled bulldozer, wheeled loader, tracked excavator, dump trucks, and water truck;
- Concrete work on the flume and fish ladder channels—Wheeled bulldozer, wheeled loader, plate compactor, portable cement/mortar mixer, dump truck, cement mixer truck, and water truck;
- Excavation and lining of the rock-lined channel—Wheeled bulldozer, wheeled loader, tracked excavator, dewatering pump, dump truck, and water truck; and
- Construction of other features—Wheeled loader, backhoe, mobile crane, forklift, dewatering pump, flatbed trucks, and water truck.

Tables 4-13 through 4-16 summarize construction noise levels from the four construction phases of Alternative 1A. Noise modeling results for distances at which there are residential land uses are shown in **bold** in Tables 4-13 through 4-16.

As noted in Tables 4-13 through 4-16, construction activities during 2011 under Alternative 1A would occur at distances of 700 feet or more from the closest residences. These distances are great enough to reduce construction noise levels to CNEL increments of less than 60 dBA. Consequently, year 2011 construction activities would not cause noise levels at nearby residences to exceed the general plan land use compatibility standards.

The first two phases of construction during 2011 under Alternative 1A would be limited to normal daytime work hours and thus would be exempt from the requirements of the Sacramento County noise ordinance. During the last two phases of construction, a berm would be needed near the entrance to the rock-lined channel, and the area protected by the berm would need to be dewatered. The noise analysis assumes that a dewatering pump would need to run continuously during these phases until the gate for the rock-lined channel is installed. Daytime construction during these two phases would be exempt from the county noise ordinance, but pump noise would be subject to the noise ordinance limits during evening and nighttime hours. County ordinance limits noise impacts at residences to 55 dBA during the evening and to 50 dBA during the nighttime. The noise analysis assumes that the pump would be near the east end of the rock-lined channel and thus would be at least 1,500 feet from the nearest residential areas.

Table 4-13. Summary of Construction Noise Impacts for Alternative 1A: Flume and Fish Ladder Channel Excavation

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	79.9	0	0	83.8	76.9
100	73.8	0	0	77.1	70.8
200	67.6	0	0	71.5	64.6
300	63.9	0	0	67.8	60.9
400	61.2	0	0	65.1	58.2
500	59.1	0	0	63.0	56.1
600	57.3	0	0	61.2	54.3
700	**55.6**	**0**	**0**	**59.7**	**52.8**
800	**54.4**	**0**	**0**	**58.4**	**51.4**
900	**53.2**	**0**	**0**	**57.1**	**50.2**
1,000	**52.1**	**0**	**0**	**56.0**	**49.1**
1,500	**47.6**	**0**	**0**	**51.6**	**44.6**
2,000	**44.1**	**0**	**0**	**48.1**	**41.1**

Notes: **Bold** = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Table 4-14. Summary of Construction Noise Impacts for Alternative 1A: Flume and Fish Ladder Concrete Work

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	76.8	0	0	82.3	73.8
100	70.7	0	0	76.2	67.7
200	64.5	0	0	70.0	61.5
300	60.8	0	0	66.3	57.8
400	58.2	0	0	63.7	55.1
500	56.0	0	0	61.6	53.0
600	54.3	0	0	59.8	51.3
700	**52.8**	**0**	**0**	**58.3**	**49.8**
800	**51.4**	**0**	**0**	**57.0**	**48.4**
900	**50.2**	**0**	**0**	**55.8**	**47.2**
1,000	**49.2**	**0**	**0**	**54.7**	**46.1**
1,500	**44.8**	**0**	**0**	**50.3**	**41.8**
2,000	**41.4**	**0**	**0**	**47.0**	**38.4**

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Table 4-15. Summary of Construction Noise Impacts for Alternative 1A: Construction of the Rock-Lined Channel

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	83.0	80.0	80.0	85.3	87.1
100	77.0	73.9	73.9	79.2	81.1
200	70.8	67.8	67.8	73.0	74.9
300	67.1	64.2	64.2	69.3	71.3
400	64.5	61.6	61.6	66.7	68.7
500	62.4	59.5	59.5	64.6	66.6
600	60.7	57.8	57.8	62.9	64.9
700	59.2	56.3	56.3	61.4	63.2
800	57.9	55.1	55.1	60.0	62.1
900	56.7	53.8	53.8	58.9	61.0
1,000	55.7	52.9	52.9	57.8	60.0
1,500	**51.4**	**48.7**	**48.7**	**53.5**	**55.8**
2,000	**48.2**	**45.6**	**45.6**	**50.2**	**52.7**

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Table 4-16. Summary of Construction Noise Impacts for Alternative 1A: Construction of Other Facilities

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	81.2	80.0	80.0	82.5	86.8
100	75.1	73.9	73.9	76.5	80.8
200	69.0	67.8	67.8	70.3	74.6
300	65.3	64.2	64.2	66.7	71.0
400	62.7	61.6	61.6	64.1	68.4
500	60.7	59.5	59.5	62.0	66.3
600	58.9	57.8	57.8	60.3	64.6
700	57.5	56.3	56.3	58.8	63.2
800	56.2	55.1	55.1	57.5	61.9
900	55.0	53.8	53.8	56.4	60.7
1,000	54.0	52.9	52.9	55.3	59.7
1,500	**49.8**	**48.7**	**48.7**	**51.1**	**55.5**
2,000	**46.7**	**45.6**	**45.6**	**48.0**	**52.4**

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

As shown in Tables 4-15 and 4-16, evening and nighttime noise levels from the pump would be less than 50 dBA at these distances and thus would comply with the county noise ordinance limits. Because construction noise levels would comply with general plan land use compatibility standards and with requirements of the county noise ordinance, construction activities during 2011 under Alternative 1A would have a less than significant noise impact.

Demolition Noise

Demolition activity in 2013 under Alternative 1A would involve removing the weir. This demolition was evaluated in terms of three general activity phases: removing rock fill upstream of the weir, removing sheet piling at the weir, and removing the concrete weir support columns. Most activity would occur on the riverbed, but some material handling and truck movements would occur onshore. Major equipment items assumed for the noise analysis included the following:

- Rock removal—Tracked bulldozer, tracked loader, tracked excavator, dump trucks, and water truck;
- Sheet piling removal—Tracked bulldozer, tracked loader, tracked material handler, heavy trucks, and water truck; and
- Concrete pier removal—Tracked loader, tracked material handler, concrete saw, dump trucks, and water truck.

Tables 4-17 through 4-19 summarize noise levels from the three weir demolition phases under Alternative 1A. Noise modeling results for distances at which there are residential land uses are shown in **bold** in Tables 4-17 through 4-19.

As noted in Tables 4-17 through 4-19, demolition during 2013 under Alternative 1A would occur as close as about 300 feet from homes on the north bank of the American River. During demolition, at distances of 300 to 600 feet from those homes, CNEL increments from demolition would exceed 60 dBA. At those times, noise levels at the nearest residences would exceed the land use compatibility criteria of the Sacramento County general plan. Consequently, demolition during 2013 under Alternative 1A would cause a significant noise impact during normal daytime work hours; as such, they would be exempt from the requirements of the Sacramento County noise ordinance. Because it is not practical to provide noise shielding for equipment working on the riverbed, these significant impacts cannot be mitigated to less than significant.

Construction Vibration

Most types of construction equipment produce only low levels of ground-borne vibrations. Vibration levels dissipate rapidly with increasing distance, with the rate of dissipation depending on the substrate through which the vibrations travel. Vibrations dissipate most slowly when traveling through solid rock and dissipate quicker when traveling through loose soil or saturated sediments. The Hatchery is built on old dredge tailings, which consist of relatively loose sediments mixed with cobbles and rocks. For analysis, these sediments were treated as a Type II substrate in the Caltrans classification (sands, sandy clays, gravels, weathered rock). Table 4-20 summarizes expected vibration impacts from typical construction equipment operating on Type II substrates.

1 **Table 4-17. Summary of Demolition Noise Impacts for Alternative 1A: Rock Removal**

Distance from Location of Equipment Activity, Feet	Incremental Demolition Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	84.8	0	0	86.7	81.8
100	78.7	0	0	80.6	75.7
200	72.5	0	0	74.4	69.5
300	**68.8**	**0**	**0**	**70.7**	**65.8**
400	**66.1**	**0**	**0**	**68.1**	**63.1**
500	**64.0**	**0**	**0**	**65.9**	**61.0**
600	**62.2**	**0**	**0**	**64.2**	**59.2**
700	**60.7**	**0**	**0**	**62.6**	**57.7**
800	**59.4**	**0**	**0**	**61.3**	**56.4**
900	**58.1**	**0**	**0**	**60.1**	**55.1**
1,000	**57.0**	**0**	**0**	**59.0**	**54.0**
1,500	**52.6**	**0**	**0**	**54.5**	**49.5**
2,000	**49.1**	**0**	**0**	**51.1**	**46.1**

2 **Bold** = distances at which there are noise-sensitive land uses.

3 Source: Tetra Tech analysis

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Table 4-18. Summary of Demolition Noise Impacts for Alternative 1A: Sheet Pile Removal

Distance from Location of Equipment Activity, Feet	Incremental Demolition Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	83.7	0	0	87.5	80.7
100	77.6	0	0	81.3	74.6
200	71.4	0	0	75.1	68.4
300	**67.7**	**0**	**0**	**71.4**	**64.7**
400	**65.0**	**0**	**0**	**68.7**	**62.0**
500	**62.8**	**0**	**0**	**66.6**	**59.8**
600	**61.0**	**0**	**0**	**64.8**	**58.0**
700	**59.5**	**0**	**0**	**63.2**	**56.5**
800	**58.1**	**0**	**0**	**61.9**	**55.1**
900	**56.9**	**0**	**0**	**60.6**	**53.9**
1,000	**55.8**	**0**	**0**	**59.5**	**52.8**
1,500	**51.2**	**0**	**0**	**55.0**	**48.2**
2,000	**47.7**	**0**	**0**	**51.4**	**44.6**

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Table 4-19. Summary of Demolition Noise Impacts for Alternative 1A: Concrete Pier Removal

Distance from Location of Equipment Activity, Feet	Incremental Demolition Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	85.5	0	0	88.1	82.5
100	79.4	0	0	82.0	76.4
200	73.2	0	0	75.8	70.2
300	**69.5**	**0**	**0**	**72.1**	**66.5**
400	**66.9**	**0**	**0**	**69.5**	**63.9**
500	**64.8**	**0**	**0**	**67.4**	**61.8**
600	**63.0**	**0**	**0**	**65.6**	**60.0**
700	**61.5**	**0**	**0**	**64.1**	**58.5**
800	**60.2**	**0**	**0**	**62.8**	**57.2**
900	**59.0**	**0**	**0**	**61.6**	**56.0**
1,000	**57.9**	**0**	**0**	**60.6**	**54.9**
1,500	**53.6**	**0**	**0**	**56.2**	**50.6**
2,000	**50.2**	**0**	**0**	**52.9**	**47.2**

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Table 4-20. Summary of Vibration Levels Expected From Typical Construction Equipment Operations

Equipment Type	Vibration Type	Parameter	Effects According to Distance From Operating Equipment		
			50 Feet	100 Feet	300 Feet
Large bulldozer	Frequent or continuous	PPV, inches/sec.	0.036	0.015	0.004
		Human response	Barely perceptible	Barely perceptible	Not perceptible
		Building damage potential	None	None	None
Small bulldozer	Frequent or continuous	PPV, inches/sec.	0.001	0.0005	0.0001
		Human response	Not perceptible	Not perceptible	Not perceptible
		Building damage potential	None	None	None
Excavator	Frequent or continuous	PPV, inches/sec.	0.001	0.0005	0.0001
		Human response	Not perceptible	Not perceptible	Not perceptible
		Building damage potential	None	None	None
Backhoe	Frequent or continuous	PPV, inches/sec.	0.001	0.0005	0.0001
		Human response	Not perceptible	Not perceptible	Not perceptible
		Building damage potential	None	None	None
Wheeled loader	Frequent or continuous	PPV, inches/sec.	0.001	0.0005	0.0001
		Human response	Not perceptible	Not perceptible	Not perceptible
		Building damage potential	None	None	None
Loaded truck pass by	Single event	PPV, inches/sec	0.031	0.013	0.003
		Human response	Not perceptible	Not perceptible	Not perceptible
		Building damage potential	None	None	None

Source: Tetra Tech analysis, using data and procedures from Caltrans (2004).

As is apparent from Table 4-20, vibration levels from the types of equipment expected to be used for Alternative 1A would have a less than significant impact at any off-site location. Vibration levels would be negligible at distances of more than 300 feet from the equipment.

Operational Noise and Vibration

The proposed project would not alter existing Hatchery operations; consequently, Alternative 1A would not create any new noise or vibration impacts from Hatchery operations.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Providing public access to Nimbus Shoals with a defined parking area would require some minor additional construction for grading and preparing the unpaved parking area and other possible visitor facilities, such as picnic table areas, sanitation facilities, and information and educational signs. The amount of construction required for these facilities would be relatively small compared to that addressed above for the main project features under Alternative 1A. Consequently, visitor management options providing public access to Nimbus Shoals with a defined parking area are not expected to have significant noise or vibration impacts.

Walk-in Only (No Public Vehicle) Access

Providing public access to Nimbus Shoals as walk-in access only would require minimal additional construction for fencing, pedestrian/bicycle pathways, and other possible visitor facilities, such as picnic table areas, sanitation facilities, and information and educational signs. The amount of construction required for these facilities would be very small compared to that addressed above for the main project features under Alternative 1A. Consequently, visitor management options providing walk-in public access to Nimbus Shoals are not expected to have significant noise or vibration impacts.

No Public Access

Eliminating public access to Nimbus Shoals would require minimal additional construction for fencing or other access restriction facilities. The amount of construction required for these facilities would be very small compared to that addressed above for the main project features under Alternative 1A. Consequently, visitor management options providing walk-in public access to Nimbus Shoals are not expected to have significant noise or vibration impacts.

4.12.2 Alternative 1C

Alternative 1C differs from Alternative 1A only in terms of fishing restrictions on the American River. Differences in fishing restrictions would not alter any of the construction activities analyzed for Alternative 1A. Consequently, noise and vibration impacts under Alternative 1C are the same as those described for Alternative 1A. Alternative 1C would have a less than significant impact on noise during 2011 but would have a significant impact on noise during weir demolition in 2013. Vibration impacts from Alternative 1C would be less than significant in both 2011 and 2013.

4.12.3 Alternative 2

Alternative 2 would remove the existing weir and construct a new weir a short distance upstream. Construction and demolition could begin as early as 2011 and occur in 2011 and 2012. During 2011, the south half of the existing weir would be removed, and the south half of the new weir would be constructed. During 2012, the north half of the existing weir would be removed, and the north half of the new weir would be constructed. All in-river work would occur from June through September. Construction and demolition would require a temporary cofferdam to protect the work areas during both construction seasons. The noise analysis assumes that the cofferdam would be a membrane-type dam, not a sheet pile dam. The analysis also assumes that the natural gradient of the riverbed would be sufficient to dewater the area protected by the cofferdam, so that no dewatering pumps would be needed.

2011 Construction Noise

Construction in 2011 under Alternative 2 was evaluated in terms of three general activity phases: constructing the cofferdam, removing the south half of the existing weir, and constructing the south half of the new weir. Most activity would occur on the riverbed, but some material handling and truck movements would occur onshore. Major equipment items assumed for the noise analysis included the following:

- Cofferdam construction—Forklift, mobile crane, flatbed trucks, and water truck;
- Weir removal—Tracked bulldozer, tracked loader, tracked excavator, tracked material handler, concrete saw, heavy trucks, and water truck; and
- Weir construction—Tracked bulldozer, tracked loader, tracked excavator, tracked material handler, mobile crane, concrete saw, welder, concrete pump, portable compressor, forklift, heavy trucks, and water truck.

Tables 4-21 through 4-23 summarize construction noise levels from the three construction phases during 2011. Noise modeling results for distances at which there are residential land uses are shown in **bold** in Tables 4-21 through 4-23.

Table 4-21. Summary of Construction Noise Impacts for Alternative 2: Construction of the Cofferdam

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	80.0	0	0	82.5	77.0
100	73.9	0	0	76.4	70.9
200	67.8	0	0	70.2	64.8
300	64.1	0	0	66.6	61.1
400	61.5	0	0	63.9	58.5
500	**59.4**	**0**	**0**	**61.8**	**56.4**
600	**57.9**	**0**	**0**	**60.1**	**54.7**
700	**56.2**	**0**	**0**	**58.6**	**53.2**
800	**54.9**	**0**	**0**	**57.3**	**51.9**
900	**53.7**	**0**	**0**	**56.2**	**50.7**
1,000	**52.6**	**0**	**0**	**55.1**	**49.6**
1,500	**48.4**	**0**	**0**	**50.8**	**45.4**
2,000	**45.1**	**0**	**0**	**47.6**	**42.1**

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Table 4-22. Summary of Construction Noise Impacts for Alternative 2: Demolition of the South Half of the Existing Weir

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	84.7	0	0	86.7	81.7
100	78.6	0	0	80.6	75.6
200	72.4	0	0	74.4	69.4
300	68.7	0	0	70.7	65.7
400	66.0	0	0	68.0	63.0
500	**63.9**	**0**	**0**	**65.9**	**60.9**
600	**62.1**	**0**	**0**	**64.1**	**59.1**
700	**60.6**	**0**	**0**	**62.6**	**57.6**
800	**59.3**	**0**	**0**	**61.3**	**56.3**
900	**58.1**	**0**	**0**	**60.1**	**55.0**
1,000	**56.9**	**0**	**0**	**59.0**	**53.9**
1,500	**52.5**	**0**	**0**	**54.5**	49.5
2,000	**49.1**	**0**	**0**	**51.1**	46.1

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Table 4-23. Summary of Construction Noise Impacts for Alternative 2: Construction of the South Half of the New Weir

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	86.4	0	0	88.7	83.4
100	80.3	0	0	82.6	77.3
200	74.1	0	0	76.4	71.1
300	70.4	0	0	72.7	67.4
400	67.7	0	0	70.1	64.7
500	**65.6**	**0**	**0**	**67.9**	**62.6**
600	**63.8**	**0**	**0**	**66.2**	**60.8**
700	**62.3**	**0**	**0**	**64.6**	**59.3**
800	**61.0**	**0**	**0**	**63.3**	**58.0**
900	**59.8**	**0**	**0**	**62.1**	**56.8**
1,000	**58.7**	**0**	**0**	**61.0**	**55.7**
1,500	**54.3**	**0**	**0**	**56.5**	**51.3**
2,000	**50.9**	**0**	**0**	**53.0**	**47.9**

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

As noted in Tables 4-21 through 4-23, construction and demolition during 2011 under Alternative 2 would occur as close as about 500 feet from homes on the north bank of the American River. Noise levels during construction of the cofferdam would not exceed the residential land use compatibility criteria in the noise element of the county general plan. But during demolition of the existing weir or construction of the new weir, activity at most locations on the riverbed would result in CNEL increments above 60 dBA at the closest homes on the north side of the American River. Those noise levels would exceed the land use compatibility criteria of the Sacramento County general plan. Construction and demolition during 2011 under Alternative 2 would cause a significant noise impact; it would be limited to normal daytime work hours and thus would be exempt from the requirements of the Sacramento County noise ordinance. Because it is not practical to provide noise shielding for equipment working on the riverbed, these significant impacts cannot be mitigated to less than significant.

2012 Construction Noise

Construction in 2012 under Alternative 2 was evaluated in terms of three general activity phases: constructing the cofferdam, removing the north half of the existing weir, and constructing the north half of the new weir. Most activity would occur on the riverbed, but some material handling and truck movements would occur onshore. Major equipment items assumed for the noise analysis included the following:

- Cofferdam construction—Forklift, mobile crane, flatbed trucks, and water truck;
- Weir removal—Tracked bulldozer, tracked loader, tracked excavator, tracked material handler, concrete saw, heavy trucks, and water truck; and
- Weir construction—Tracked bulldozer, tracked loader, tracked excavator, tracked material handler, mobile crane, concrete saw, welder, concrete pump, portable compressor, forklift, heavy trucks, and water truck.

Tables 4-24 through 4-26 summarize construction noise levels from the three construction phases of activity during 2012. Noise modeling results for distances at which there are residential land uses are shown in **bold** in Tables 4-24 through 4-26.

As noted in Tables 4-24 through 4-26, construction and demolition during 2012 under Alternative 2 would occur as close as about 300 feet from homes on the north bank of the American River. Construction and demolition at most locations on the riverbed would result in noise levels above the residential land use compatibility criteria in the noise element of the county general plan (a CNEL of 60 dBA). Construction and demolition during 2012 under Alternative 2 would cause a significant noise impact; it would be limited to normal daytime work hours and thus would be exempt from the requirements of the Sacramento County noise ordinance. Because it is not practical to provide noise shielding for equipment working on the riverbed, these significant impacts cannot be mitigated to less than significant.

Construction Vibration

Ground vibration impacts under Alternative 2 are the same as those presented in Table 4-20 for Alternative 1A. Vibration levels from the types of equipment expected to be used for Alternative 2 would be negligible at distances of more than 300 feet from the equipment.

Table 4-24. Summary of Construction Noise Impacts for Alternative 2: Construction of the Cofferdam

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	80.0	0	0	82.5	77.0
100	73.9	0	0	76.4	70.9
200	67.8	0	0	70.2	64.8
300	**64.1**	**0**	**0**	**66.6**	**61.1**
400	**61.5**	**0**	**0**	**63.9**	**58.5**
500	**59.4**	**0**	**0**	**61.8**	**56.4**
600	**57.9**	**0**	**0**	**60.1**	**54.7**
700	**56.2**	**0**	**0**	**58.6**	**53.2**
800	**54.9**	**0**	**0**	**57.3**	**51.9**
900	**53.7**	**0**	**0**	**56.2**	**50.7**
1,000	**52.6**	**0**	**0**	**55.1**	**49.6**
1,500	**48.4**	**0**	**0**	**50.8**	**45.4**
2,000	**45.1**	**0**	**0**	**47.6**	**42.1**

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Table 4-25. Summary of Construction Noise Impacts for Alternative 2: Demolition of the North Half of the Existing Weir

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	84.7	0	0	86.7	81.7
100	78.6	0	0	80.6	75.6
200	72.4	0	0	74.4	69.4
300	**68.7**	**0**	**0**	**70.7**	**65.7**
400	**66.0**	**0**	**0**	**68.0**	**63.0**
500	**63.9**	**0**	**0**	**65.9**	**60.9**
600	**62.1**	**0**	**0**	**64.1**	**59.1**
700	**60.6**	**0**	**0**	**62.6**	**57.6**
800	**59.3**	**0**	**0**	**61.3**	**56.3**
900	**58.1**	**0**	**0**	**60.1**	**55.0**
1,000	**56.9**	**0**	**0**	**59.0**	**53.9**
1,500	**52.5**	**0**	**0**	**54.5**	49.5
2,000	**49.1**	**0**	**0**	**51.1**	46.1

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Table 4-26 Summary of Construction Noise Impacts for Alternative 2: Construction of the North Half of the New Weir

Distance from Location of Equipment Activity, Feet	Incremental Construction Noise Level (dBA)				
	Daytime Average	Evening Average	Nighttime Average	Daytime Maximum Hourly Average	CNEL
50	86.5	0	0	88.8	83.5
100	80.4	0	0	82.7	77.4
200	74.2	0	0	76.5	71.2
300	**70.5**	**0**	**0**	**72.8**	**67.5**
400	**67.8**	**0**	**0**	**70.1**	**64.8**
500	**65.7**	**0**	**0**	**68.0**	**62.7**
600	**63.9**	**0**	**0**	**66.2**	**60.9**
700	**62.4**	**0**	**0**	**64.7**	**59.4**
800	**61.1**	**0**	**0**	**63.4**	**58.1**
900	**59.9**	**0**	**0**	**62.2**	**56.9**
1,000	**58.8**	**0**	**0**	**61.1**	**55.8**
1,500	**54.4**	**0**	**0**	**56.6**	**51.4**
2,000	**51.0**	**0**	**0**	**53.1**	**48.0**

Bold = distances at which there are noise-sensitive land uses.

Source: Tetra Tech analysis

Operational Noise and Vibration

The proposed project would not alter existing Hatchery operations, so Alternative 2 would not create any new noise or vibration impacts from Hatchery operations.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Providing public access to Nimbus Shoals with a defined parking area would require some minor additional construction for grading and preparing the unpaved parking area and other possible visitor facilities, such as picnic table areas, sanitation facilities, and information and educational signs. The amount of construction activity required for these facilities would be relatively small compared to that addressed above for the main project features under Alternative 2. Consequently, visitor management options providing public access to Nimbus Shoals with a defined parking area are not expected to have significant noise or vibration impacts.

Walk-in Only (No Public Vehicle) Access

Providing public access to Nimbus Shoals as walk-in access only would require minimal additional construction for fencing, pedestrian/bicycle pathways, and other possible visitor facilities, such as picnic table areas, sanitation facilities, information and educational signs. The amount of construction required for these facilities would be very small compared to that addressed above for the main project features under Alternative 2. Consequently, visitor management options providing walk-in public access to Nimbus Shoals are not expected to have significant noise or vibration impacts.

No Public Access

Eliminating public access to Nimbus Shoals would require minimal additional construction for fencing or other access restriction facilities. The amount of construction required for these facilities would be very small compared to that addressed above for the main project features under Alternative 2. Consequently, visitor management options providing walk-in public access to Nimbus Shoals are not expected to have significant noise or vibration impacts.

4.12.4 No Action Alternative

There would be no new construction activity and no changes in operational procedures at the Hatchery under the No Action Alternative. Consequently, the No Action Alternative would not create any new noise or vibration impacts.

4.13 Land Use

A land use impact is considered significant if implementation of the proposed project or project alternatives would result in the following:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

Impacts on recreation and aesthetics are addressed in Sections 4.3 and 4.14, respectively. As there are no agricultural resources in the region of influence, no impacts to such resources would result from implementation of the proposed project.

Not all of the land uses described in Section 3.13 would be impacted by the proposed project or the alternatives, so only those resource uses where there would be an impact are discussed. While implementation of the proposed action would not result in any land use incompatibilities, there would be some impacts, as described below.

None of the project alternatives would physically divide an established community, conflict with applicable land plans or policies, or conflict with any habitat or natural community conservation plans.

4.13.1 Alternative 1A

The public's use of lands in the project area, including recreation and parking, would be temporarily restricted at times during construction; however, the land use in the project area would not be permanently altered by implementation of the project, and no land use impacts would occur.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

The defined parking area option would not conflict with the recreational land use designation for Nimbus Shoals in American River Parkway Plan or the Folsom Lake State Recreation Area and Folsom Powerhouse State Historic Park General Plan and Resource Management Plan. Therefore, there would be no impact.

Walk-in Only (No Public Vehicle) Access

Eliminating public vehicle access would not conflict with the recreational land use designation for Nimbus Shoals in the American River Parkway Plan or the Folsom Lake

State Recreation Area and Folsom Powerhouse State Historic Park General Plan and Resource Management Plan. Therefore, there would be no impact.

No Public Access

Although the American River Parkway Plan and the Folsom Lake State Recreation Area and Folsom Powerhouse State Historic Park General Plan and Resource Management Plan designate the Nimbus Shoals area as a recreational area, the plan allows for limitation of use of the parkway to prevent overuse and to protect environmental quality. Therefore, although the no public access scenario would reduce the amount of recreation land in the parkway by approximately 12 acres, this change would not conflict with the applicable land use plans, so impacts would be less than significant.

4.13.2 Alternative 1C

Impacts on land use are the same as those described under Alternative 1A.

4.13.3 Alternative 2

The public's use of lands in the project area, including recreation and parking, would be temporarily restricted at times during construction; however, impacts would be less than under Alternatives 1A and 1C due to the smaller construction footprint. Public access to Nimbus Shoals would not be impacted under Alternative 2. The land use in the project area would not be permanently altered by implementation of the project, and no land use impacts would occur.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

As described under Alternative 1A, no impact would occur.

Walk-in Only (No Public Vehicle) Access

As described under Alternative 1A, no impact would occur.

No Public Access

As described under Alternative 1A, less than significant adverse impacts would occur.

4.13.4 No Action Alternative

The No Action Alternative would continue using the existing diversion weir. There would be no land use impacts under the No Action Alternative.

4.14 Aesthetics and Visual Resources

The proposed project would result in a significant impact on visual and aesthetic resources if it were to result in the following:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

4.14.1 Alternative 1A

Removing the existing weir would be beneficial to visual and aesthetic resources under Alternative 1A because the weir compromises the visual character of the American River, and its removal would aesthetically enhance the view of the river. The construction of a new fish passageway southeast of Nimbus Hatchery with a tie-in to the existing fish passageway under this alternative would not adversely impact visual resources. This is because there are existing buildings and structures on both sides of Hazel Avenue, so the visual character of the area has already been compromised.

Areas from which vegetation is temporarily removed for construction of the fish ladder would be revegetated once construction is complete. Permanent loss of vegetation due to construction would not be significant. Reclamation has committed to vegetative management plans that would occur before, during, and after construction to minimize the immediate and long-term impacts on visual resources, as discussed in Section 3.2.

Construction of this alternative would alter views for the resident along the bluffs, for anglers in the shoals area, and for motorists traveling along Hazel Avenue. Construction would also be visible from the northbound and southbound lanes. Construction is expected to take place during daylight, so no night lighting would be necessary. After construction, the amount of lighting for the facility and the area would remain the same as the existing conditions (Robinson 2009b). These construction impacts would be considered temporary and direct but would be less than significant.

Construction staging areas and equipment would create a temporary direct impact because construction would be visible from nearby residences and travelers on Hazel Avenue Bridge and Gold Country Boulevard. Although construction would create changes in the visual setting of the area, these impacts would be temporary and would be less than significant. The environmental commitments for visual resources (Appendix C) would further reduce potential impacts on visual and aesthetic resources, so changes in the visual character of the project area would be less than significant. Alternative 1A would not have an adverse impact on a scenic vista or scenic resources.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

As discussed above, the visual character of Nimbus Shoals area has already been compromised by building construction. Therefore, the option for public vehicle access with defined parking would not have further substantial adverse effects because the visual character of the area has already been diminished. The provision included in this option that vehicles would not be able to be driven to the water's edge and would instead be limited to a defined parking area would be slightly beneficial to the visual quality of Nimbus Shoals in that there would not be cars visible along the water's edge. Under this option, there would be no adverse impact on a scenic vista or on visual resources. Construction would be temporary and would have less than significant impacts on visual resources.

Walk-in Only (No Public Vehicle) Access

Impacts on the visual character of the area are the same as those described for the public vehicle access with defined parking option. Construction would be temporary and would have less than significant impacts on visual resources.

No Public Access

Impacts on the visual character of the area are the same under Alternative 1A with no change in visitor management.

4.14.2 Alternative 1C

Impacts on visual resources under Alternative 1C are similar to those described for Alternative 1A. Changes in the fishing closures would not substantially degrade the current scenic characteristics of the area. There would be no substantial adverse impact on visual and aesthetic resources under Alternative 1C. Temporary construction activities would have less than significant impacts on visual resources.

4.14.3 Alternative 2

The construction of a replacement weir under Alternative 2 would not substantially degrade the visual character of the area. The replacement weir would look different from the existing weir and would be a solid concrete structure, visible at the surface of the river. However, the visual and aesthetic character of the area is already compromised by the built environment and weir. Constructing a new weir just upstream of the existing fish ladder would not further degrade the visual character. Concrete piers are visible when the superstructure is removed on the existing weir, and the replacement weir would also contain pickets that are visible when the gates are in the raised position. When the river is less than 5,000 cfs, the crest of the new weir would be visible. While the character of the existing and replacement weirs would look different, there would be no substantial effect on the scenic character of the project area, which already contains a weir that crosses in the river. Impacts from temporary construction activities under this alternative would be the same as those under Alternative 1A and would be less than significant.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Impacts from Alternative 2 are the same as those described for Alternative 1A.

Walk-in Only (No Public Vehicle) Access

Impacts from Alternative 2 are the same as those described for Alternative 1A.

No Public Access

Impacts from Alternative 2 are the same as those described for Alternative 1A.

4.14.4 No Action Alternative

Under the No Action Alternative, there would be no changes in scenic views or night and glare impacts.

4.15 Socioeconomics and Environmental Justice

This section describes the potential impacts on the socioeconomics and environmental justice resources in the project area from implementing the four alternatives identified in Chapter 2. Impacts may be considered to be significant if they were to result in any of the following:

- Induce substantial population growth in the project area, either directly (for example by proposing new homes and businesses) or indirectly (for example, by extending roads or other infrastructure);
- Displace substantial numbers of housing units or create demand for additional housing, necessitating the construction of replacement housing;
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere;
- Adversely affect the unemployment rate for Sacramento County;
- Change total income or business volume;
- Affect the quality of life of the visitors to the project area;
- Affect the local housing market and vacancy rates, particularly with respect to the availability of affordable housing;
- Change any social, economic, physical, environmental, or health conditions so as to disproportionately affect any particular low-income or minority group; or
- Disproportionately endanger children in areas on or near the project area.

4.15.1 Alternative 1A

Demographics, Housing, and Employment

Removing the diversion weir and installing a modified fish passageway would not induce population growth within the project area or displace population or housing units. Implementing Alternative 1A does not include new residential or commercial construction, so it would not directly induce population growth. Further, Alternative 1A would not displace housing units or create demand for additional housing during or after construction. Since people would not be displaced by Alternative 1A, replacement housing would not be required elsewhere, so there would be no impact on displacement of people or the need for replacement housing elsewhere under Alternative 1A.

During the construction period, implementing Alternative 1A would result in a marginal increase in employment. However, this would not necessitate the relocation of workers to the project area. Potential spending by construction employees within the project area could result in a short-term, localized, beneficial economic stimulus over the two-year construction/demolition period. After construction is completed, Alternative 1A would not change employment or business volume. The number of Hatchery employees is not expected to change under this alternative.

Implementing Alternative 1A could result in adverse and beneficial impacts on the quality of life of the visitors to the project area. Short-term adverse effects would result from the temporary parking closures of the Hatchery parking lot and the CSUS Aquatic Center., Placing the viewing plaza would enhance the recreation resources within the project area and therefore would result in long-term beneficial impacts on the quality of life of the visitors. Impacts on public access and visitors are discussed in detail in Section 4.3, which concludes that impacts on recreation resources under Alternative 1A would be less than significant.

Implementing Alternative 1A would not create disproportionate environmental health and safety risks to children. Project activities would be fenced in during the construction period and would limit physical dangers to the public. The area would be off-limits to children.

Implementing Alternative 1A is not expected to have environmental justice impacts. Sacramento County is not a predominantly minority or low-income community, so the proposed construction and operation of the modified fish passageway is not expected to disproportionately affect minority or low-income groups.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Implementing this management option would enhance the quality of life of the visitors to Nimbus Shoals by providing such visitor amenities as picnic tables, sanitation, trash cans, and interpretive/education signs. Additionally, with ADA-compliant facilities, visitor access would also improve the quality of life, resulting in beneficial effects.

Walk-in Only (No Public Vehicle) Access

The management option of walk-in only would have the same beneficial effects on the quality of life as those described under the public vehicle access with defined parking option. However, the absence of parking spaces in Nimbus Shoals could be inconvenient for visitors. This inconvenience would not be significant as parking would be provided at the Hatchery, and Nimbus Shoals would be easily accessed via the foot gate that would be provided as part of this management option.

No Public Access

The management option of no public access would affect the quality of access of the visitors to the project area by prohibiting any access to Nimbus Shoals. However, this impact would not be considered significant for visitors seeking picnic areas as they can access other recreation areas in the vicinity, such as Lake Natoma. However, with no public access, fish viewing at Nimbus Shoals would not be available. This impact would also not be significant as fish viewing would still be available at the Hatchery.

4.15.2 Alternative 1C

Impacts on the socioeconomic resources and environmental justice in the project area under Alternative 1C are similar to those discussed above for Alternative 1A. The only difference is the more restrictive fishing regulations. Completely eliminating fishing in the area between the USGS gaging cable and the Nimbus Dam would reduce sportfishing opportunities in the vicinity. This would impact the quality of life of the visitors to the project area; impacts would be less than significant. Impacts on sportfishing are discussed in Section 4.3.

4.15.3 Alternative 2

Alternative 2 involves replacing the diversion weir with a six-bay bypass and a denil fish ladder. The current fishing closures within 250 feet of the fish ladder entrance and outfall would remain in effect. Full access to the Nimbus Shoals region would continue under this alternative. As with Alternative 1A, short-term beneficial impacts on employment and business volume in the project area would occur during construction/demolition. Implementing Alternative 2 would have similar impacts as those discussed under Alternative 1A on child protection and environmental justice.

Impacts related to public access during construction are the same as those described under Alternative 1A.

Operation of the new diversion weir would impact the quality of life due to possible decreased fishing opportunities. This is discussed in more detail in Section 4.3.

Visitor Management Options for Nimbus Shoals

Public Vehicle Access with Defined Parking

Impacts would be the same as under Alternative 1A.

Walk-in Only (No Public Vehicle) Access

Impacts would be the same as under Alternative 1A.

No Public Access

Impacts would be the same as under Alternative 1A.

4.15.4 No Action Alternative

Implementing the No Action Alternative would have no impacts on socioeconomics and environmental justice.

4.16 Cumulative Impacts

This section is a description of the cumulative projects and a discussion of the cumulative impacts of those projects, in combination with the previously identified effects of the proposed project alternatives.

A cumulative impact is defined in the Code of Federal Regulations (40 CFR, Part 1508.7) as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

CEQA Guidelines Section 15355 states that "cumulative impacts refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.

> (a) The individual effects may be changes resulting from a single project or a number of separate projects.
>
> (b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the 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."

The proposed project alternatives have been assessed for cumulative impacts with other actions in the project vicinity. Identified current or reasonably foreseeable actions in the affected region are described below.

4.16.1 Cumulative Projects

The cumulative projects were identified through research and consultation with Reclamation and the CDFG. Projects include widening Hazel Avenue and the Hazel Avenue Bridge, injecting spawning gravel into the lower American River, multiple upgrades and improvements to Nimbus Dam and the Folsom Dam complex, and mixed use development near the Hazel Avenue light rail station. Plans that affect the project vicinity include the Nimbus Hatchery Genetic Management Plan, the Nimbus Hatchery Visitor Use Plan, the American River Parkway Plan, and the Folsom Lake SRA Resource Management Plan and State Park General Plan. In addition, the Reasonable and Prudent Alternative (RPA) for Long-Term Operation of the Central Valley Project (CVP) and State Water Project (SWP) includes a long-term recommendation to implement fish passage at Nimbus Dam and other RPAs that impact temperatures and flows on the lower American River.

Cumulative projects proposed in the project vicinity are summarized in Table 4-27.

Table 4-27. Cumulative Projects and Plans

Project	Project Proponent	Implementation Date	Description
Hazel Avenue Widening Project	FHWA, County of Sacramento	Spring 2009 until February 2011	Widen Hazel Avenue from four to six lanes from Madison Avenue to US Highway 50, including the Hazel Avenue Bridge over the American River.
American River Spawning Gravel Project	Reclamation	Ongoing	Introduction of spawning gravels into the American River next to and immediately downstream of the Nimbus Hatchery.
Nimbus Dam Improvements	Reclamation	Ongoing	Various projects to upgrade, improve, and replace aging equipment, including spillway gates, generators and power production system, transformers, and cooling systems.
Nimbus Hatchery Genetic Management Plan (HGMP)	NMFS, Reclamation, and CDFG	Ongoing	The goal of an HGMP is to devise biologically based artificial propagation management strategies that ensure the conservation and recovery of ESA-listed salmon and steelhead populations.
RPA for Long-Term Operation of the CVP and SWP	NMFS	June 4, 2009	To operate these water projects in compliance with the ESA, implement the following on the American River: a flow management standard, additional temperature management measures, and, in the long term, fish passage at Nimbus and Folsom Dams.
American River Parkway Plan	County of Sacramento	2008 until revised	Policy document that guides land use decisions affecting the American River Parkway.
Folsom Lake State Recreation Area and Folsom Powerhouse State Historic Park General Plan and Resource Management Plan	Reclamation and California Department of Parks and Recreation	To be determined	Policy document that guides land use decisions affecting the Folsom Lake State Recreation Area.
Hazel Light Rail Station Transit-Oriented Development	County of Sacramento	Not specified; necessary zoning changes under consideration as of March 2009	Develop the area within a half-mile of the Hazel Avenue Light Rail Station with land uses, including mixed-use commercial and residential.
Folsom Dam Safety and Flood Damage Reduction Project	Reclamation, USACE	Fall 2007 until fall 2020	Complete modifications to structures in the Folsom Dam Complex to address public safety, security, seismic, and hydrologic concerns.
Nimbus Hatchery Visitor Use Plan	Reclamation, CDFG	2010 through 2012	Development of a plan to manage visitor use and interpretive services at the Nimbus Hatchery and surrounding lands.

Hazel Avenue Widening Project

Construction began in April 2009 on a project to widen Hazel Avenue from four to six lanes, from Madison Avenue to US Highway 50. Madison Avenue is approximately 2.2 miles north, and US Highway 50 is approximately 0.3 mile south of the project area. The project would modify the Hazel Avenue Bridge that crosses the American River within the project area between the Hatchery and the Nimbus Dam. The purpose and need for the project are to improve safety and provide congestion relief on Hazel Avenue. The Final EIR/EA for the project was published in September 2006, and the Finding of No Significant Impact was approved on June 7, 2007 (County of Sacramento DERA 2006b; Department of Transportation, Federal Highway Administration [DOT FHWA] 2007). The current schedule calls for construction to be completed in winter 2011 (Robinson 2009e).

A portion of the Hatchery parking lot and grounds would be used for construction staging and access and would be restored when construction is complete. The project includes the installation of a waterless vault toilet on the south side of the American River in the vicinity of the bike trail. The project includes improved access to the American River Parkway, with ADA-compliant bike paths or stairways in all four quadrants of the bridge crossing of the American River (County of Sacramento, DERA 2006b).

Lower American River Salmonid Spawning Gravel Augmentation and Side-Channel Habitat Establishment Program

The purpose of the program is to increase and improve salmon and steelhead spawning and rearing habitat by replenishing spawning gravel and establishing additional side-channel habitat at new restoration sites in the Lower American River between Nimbus Dam and Upper Sunrise Recreation Area and at Arden Rapids in Sacramento County. The program began in September of 2008 and derives from the need for increased salmonid spawning and rearing habitat, which was lost in part due to the curtailment of gravel recruitment to the natural river channel since its blockage by dams. Up to 75,000 cubic yards of gravel would be added to the river at seven sites over five years. Side channel habitat would be created or restored at three sites. Because this is an ongoing program, Reclamation proposes to initiate high priority projects first and then to initiate lower priority projects over the years. Depending on hydrologic events, some projects may be revisited after completion. The program consists of three distinct components: augmenting spawning gravel, acquiring, processing, and stockpiling spawning gravel, and creating side-channel habitats.

Seven sites for augmenting gravel have been identified, as follows:

- Site 1, Nimbus Basin—Starts about 60 yards downstream of Nimbus Dam at River Mile (RM) 23 and extends about 190 yards downstream;

- Site 2, Upper Sailor Bar-Upstream—Located at Sailor Bar, next to the lower portion of the American River Fish Hatchery at about RM 22.5. It extends from just upstream of the USGS cable across the river to the end of the Hatchery, a distance of about 95 yards;

- Site 3, Upper Sailor Bar-Downstream—Located at Sailor Bar, from the lower portion of the Hatchery settling basins, extending about 165 yards downstream at about RM 22.4;
- Site 4, Lower Sailor Bar—Located downstream from the island at lower Sailor Bar at about RM 21.8;
- Site 5, Upper Sunrise—Located about 500 feet upstream of the island, at the Upper Sunrise Recreation Area, at about RM 21.4;
- Site 6, Upper Sunrise Side Channel—Located at the upstream end of the island that forms the Upper Sunrise Side Channel at about RM 21.2; and
- Site 7, River Bend Park (formally C. M. Goethe Park)—Located between the Jedediah Smith Bridge at River Bend Park and the Arden Rapids at about RM 13.6.

Reclamation would acquire the entire 75,000 cubic yards of gravel from Mississippi Bar and is considering acquiring about half of the needed amount from Sailor Bar as an alternative.

Three sites have been identified where side channels could be developed to provide salmonid spawning and rearing habitat; as follows:

- Site 1, Nimbus Shoals—Located on Nimbus Shoals on the south side of the river, at about RM 22.9. This side channel would start in the Nimbus Dam stilling basin north of the proposed fish ladder and would cross the bar to the river; it would be approximately 350 yards long. Construction at this site would occur after completion of the Hazel Avenue Bridge widening and construction of the new Hatchery fish ladder. The construction of the side channel would be coordinated with CDPR.
- Site 2—Located at upper Sailor Bar on the north side of the river at about RM 22.5. This side channel would start just downstream of the USGS cable crossing, would follow the north side of the bar, and then would cut across the bar to the river, a distance of about 210 yards. The width would average about 20 feet, and about 4,000 cubic yards would be excavated and spread on the adjacent bar.
- Site 3—Located at the Upper Sunrise side channel on the south side of the river, at about RM 21.2. This side channel was traditionally an excellent steelhead spawning area, but in recent years, the main river channel has downcut near the head of the side channel, lowering the water level and dewatering the side channel at typical winter flows.

Nimbus Dam Improvements

Reclamation has a number of projects at Nimbus Dam to replace, rehabilitate, and improve the existing aging infrastructure at Nimbus Dam. Projects include rehabilitating the radial gates, bearings, motors, and control system; rewinding the generator, replacing the runner, and overhauling the excitation system; replacing the transformer and substation; replacing the building cooling system; retrofitting the generator seismic system and gantry crane, and installing a trash rack rake. These projects are in various stages of completion and are subject to independent environmental review. Work is in addition to ongoing maintenance and is accomplished as funding priorities allow.

Nimbus Hatchery Genetic Management Plan

HGMPs are described in the final salmon and steelhead 4(d) rule issued by the NMFS as a mechanism for addressing take of ESA-listed species that may occur as a result of artificial propagation activities. The NMFS uses the information provided by HGMPs to evaluate impacts on salmon and steelhead listed under the ESA. The HGMPs would apply to evaluation and issuance of ESA Section 10 take permits issued to CDFG and incorporated into ESA Section 7 consultations with Reclamation on project operations. Completed HGMPs may also be used for regional fish production and management planning by federal, state, and tribal resource managers. The NMFS has requested that a draft HGMP be submitted by March 31, 2012.

RPA for the CVP and the SWP

The CVP and SWP are two major interbasin water storage and conveyance systems that provide drinking water, irrigation water, and hydroelectric power to many California residents. The Nimbus Dam and Folsom Dam, both of which are upstream of the project area on the lower American River, are included in the CVP/SWP. The CVP and SWP are operated in accordance with their respective water rights permits and licenses administered by the SWRCB. Operation of the two projects is managed through the Coordinated Operating Agreement, which was signed by Reclamation and the California Department of Water Resources in November 1986. ESA Section 7 consultation was subsequently initiated on long-term operations of the CVP/SWP, as defined in the Coordinated Operating Agreement. In June 2009, the NMFS issued a biological opinion and conference opinion stating that the long-term operations of the CVP/SWP are likely to jeopardize the continued existence of multiple listed species or to destroy or adversely modify designated and proposed critical habitat for some of those species, including chinook salmon and steelhead (NMFS 2009).

When the NMFS finds that a proposed action is likely to jeopardize a listed species or adversely modify its critical habitat, the ESA requires the NMFS to suggest those RPAs that it believes would enable the project to go forward in compliance with the ESA. The NMFS prepared an RPA for the American River, which prescribes a flow management standard, a temperature management plan, temperature objectives, additional technological fixes to temperature control structures, and, in the long term, fish passage at Nimbus and Folsom Dams to restore steelhead to native habitat. Implementing fish passage at the Nimbus and Folsom Dams would compensate for modifying critical habitat, would allow steelhead to pass into colder upstream water more suitable for spawning and juvenile survival, and would reduce the mixing of wild and Hatchery-raised steelhead and the resulting loss of genetic diversity.

American River Parkway Plan

In 2008, the County of Sacramento Municipal Services Agency Planning and Community Development Department finalized the American River Parkway Plan 2008 (ARPP), which is an approximately 29-mile open space greenbelt from Folsom Dam at the northeast to the American River's confluence with the Sacramento River at the southwest, thus including the project area. The ARPP is a policy and action document whose purpose is to guide land use decisions affecting the parkway. It is written to ensure preservation of the naturalistic environment, while providing limited developments to facilitate human enjoyment of the parkway. The management goals and policies of the ARPP can be summarized as preserving naturalistic open space, while protecting environmental quality within the urban environment and providing recreation opportunities. The area downstream of the Hazel Avenue Bridge is managed as the Upper Sunrise Area on the south shore and as the Sailor Bar Area on the north shore. The plan policy for Upper Sunrise is not to increase development but to protect the unique biological and cultural resources in the area. The plan policy for Sailor Bar is to ensure that any development has minimal impact on natural resources and residential properties. The area north of the Hazel Avenue Bridge is managed as part of the Folsom Lake SRA, Lake Natoma Unit. The County of Sacramento adopted the Parkway Plan as an element of its General Plan (County of Sacramento, Planning and Community Development Department 2008). The alternatives for the proposed project are considered consistent with the policies and goals of the ARPP.

Folsom Lake SRA and Folsom Powerhouse State Historic Park General Plan (GP) and Resource Management Plan (RMP)

Reclamation and the CDPR completed a GP/RMP and EIS/EIR for the Folsom Lake SRA. The Folsom Lake SRA encompasses approximately 20,000 acres of land and water from the confluence of the North and South Forks of the American River in the Sierra Nevada foothills to the area downstream of Nimbus Dam and encompasses the area of the proposed project. Reclamation owns most of the Folsom Lake SRA, which it manages through agreement by the CDPR, although the CDPR has acquired some of the land. The GP/RMP provides a programmatic management framework for the Folsom Lake SRA that will guide day-to-day decisions about the area's use and development. The management intent for the Nimbus Dam area is to maintain the primary role of the area in flood control, water supply, power generation, and Hatchery operations. The management intent for the Nimbus Shoals area, as stated in the RMP, is to maintain and enhance recreation resources and to ensure continued access during special events (CDPR and Reclamation 2007, 2009).

Folsom Dam Safety and Flood Damage Reduction Project

Reclamation and the USACE seek to improve the safety and security of the Folsom Dam complex by modifying the dam and its appurtenant structures. The Folsom Dam complex includes the Main Folsom Dam, Mormon Island Auxiliary Dam, the two wing dams, and eight dikes. In RODs dated May 2007, the agencies indicated that they would proceed with the preferred alternative, as described in a final EIS/EIR dated March 2007. To address seismic, hydrologic, and static concerns for structures that make up the Folsom Facility, Reclamation would modify the main concrete dam, the right wing dam, the left wing dam, Dikes 4, 5, and 6, and the Mormon Island Auxiliary Dam, as described in the final EIS/EIR. To improve security, Reclamation would install security cameras and improve lighting. To improve hydrologic control of releases from Folsom Lake, Reclamation would install a submerged six-tainter gate structure, which is an auxiliary spillway. The project would be implemented in phases beginning in fall 2007 with modifications to the right and left wing dams and the auxiliary spillway, and ending in fall 2020 with spillway modifications and repairs (Reclamation and US Army Corps of Engineers [USACE] 2007; Reclamation 2007). In April 2008, Reclamation published a Finding of No Significant Impact and Final Supplemental Environmental Assessment that addressed schedule changes and additional implementation details (Reclamation 2008b).

Hazel Light Rail Station Transit Oriented Development (TOD)

Recognizing that areas within a half-mile of light rail stations provide a unique opportunity for land use development, the County of Sacramento launched an effort in 2007 to develop TOD guidance for the Special Planning Area around the Hazel Light Rail Station. The Hazel Station is approximately half a mile southeast of the Nimbus Dam. On March 5, 2009, the County of Sacramento took the next step in the planning process and published an Special Planning Area document that provides the zoning changes and land use direction that will enable TOD around the Hazel Station (County of Sacramento 2007; County of Sacramento, Planning and Community Development Department 2009).

Proposed projects included in the Special Planning Area are the Nimbus Winery Project, Easton Place, and Glenborough. The Nimbus Winery Project would expand the facility by adding commercial services along Folsom Boulevard and potentially adding condominiums. Easton Place is a mixed-use urban village concept, including 1,194 dwelling units and 280,000 square feet of commercial and office space. The Easton/Glenborough projects would include approximately 3,000 single-family homes and 2,000 apartments and condominiums. The final proposed projects would be included in a Transit Area Plan that would have to be adopted by the County Board of Supervisors before implementation (County of Sacramento 2007; County of Sacramento, Planning and Community Development Department 2009).

Development of the SPA would require designated recreation open space or fees paid in lieu of designating open space, as specified in Chapter 22.40 of the Sacramento County Code (County of Sacramento 2007; County of Sacramento, Planning and Community Development Department 2009). The proposed projects would increase the overall development and density of the area, which would likely increase use of nearby recreational facilities, including the American River within the project area. In addition, the area is primarily residential, and the proposed projects would result in a higher percentage of commercial and office space in the area.

4.16.2 Fisheries

Development near the project area has occurred in the past and is likely to continue. These projects alone may not impact the fisheries in the area, but, taken together, they may have a cumulative impact. Under all alternatives, cumulative effects would be less than significant.

The Havel Avenue Widening Project began in April 2009 to widen Hazel Avenue from four to six lanes. As part of this project, the Hazel Avenue Bridge spanning the American River in the project area would also have to be widened, requiring in-river work. This work could increase erosion or sedimentation to the water and thereby adversely impact the habitat quality for fish in the area. An environmental assessment/EIR completed for this project included numerous mitigation measures to ensure that the impacts were less than significant (County of Sacramento, DERA 2006a). Work on this project is anticipated to continue through 2011. Additionally, this project includes adding a waterless vault toilet and day-use horse stables. Adding these facilities could increase visitor use to the area, which in turn would increase the potential for littering or for illegally harvesting steelhead or chinook salmon.

The Lower American River Salmonid Spawning Gravel Augmentation and Side-Channel Habitat Establishment Program began in September 2008. Its goal is to improve the spawning habitat in the lower American River by placing up to 75,000 cubic yards of gravel in seven sites (approximately 10,700 cubic yards per site) and creating three side channels for spawning. Two of these sites are within the project area, approximately 95 yards upstream of the USGS gaging cable and in the stilling basin. The other five sites are downstream of the project area. As steelhead and chinook salmon use areas of the river with gravel streambeds, placing gravel would have a beneficial impact by increasing spawning habitat. Additionally, creating or restoring side channels would also increase the amount of spawning habitat available. One site for side channel creation is identified in the Nimbus Shoals area. One potential item of concern is that, if Alternative 2 were implemented and the new weir were to completely block all passage for adult salmonids past the weir, the gravel deposition area and the side channel habitat upstream of the weir would likely no longer be used and the beneficial impact of the project would be lessened. Implementing Alternatives 1A or 1C would allow all fish access to the stilling basin and therefore to the additional spawning habitat. Creating spawning habitat downriver of the entrance to the Nimbus Hatchery would likely entice some spawning steelhead or chinook to stop migrating upriver, which could lower the number of fish entering the hatchery. This impact would likely be less than significant due to the run sizes of the fish migrating in the lower American River.

Improvements to the Nimbus Dam, which are ongoing, would not likely have an adverse impact on the fisheries in the area. One potential adverse impact would occur if river flows downriver of the dam were lowered to allow for dam maintenance. The level of this impact would depend on the amount of time required to lower flow levels. Additionally, use of heavy equipment could introduce oils, fuels, and grease into the water. Depending on the amount or timing of these discharges, there may be an adverse impact on the habitat quality for fisheries in the area. These improvements to the dam would be subject to independent environmental review, and mitigation measures would limit the adverse impacts.

The Nimbus Hatchery Genetic Management Plan addresses take of listed species during the operation of the Nimbus Hatchery. The preparation and implementation of this plan would not have any adverse or cumulative impacts on either the steelhead or the chinook salmon. This plan would be used to determine the issuance of ESA Section 120 permits, with the goal of protecting and delisting the species. Overall, this plan would have a beneficial impact on the listed species in the area.

The RPA for the CVP and the SWP is in response to the NMFS's opinion that operating the CVP and SWP would likely jeopardize the existence of multiple listed species, including steelhead and chinook salmon. The CVP and SWP are the two major interbasin water storage and conveyance systems that provide drinking water, irrigation water, and power to many California residents. Both the Nimbus Dam and Folsom Dam (upstream of the Nimbus Dam and the project area) are part of the CVP and SWP. The ESA requires the NMFS to provide an RPA that it believes would allow the project to move forward. The RPA has identified several measures that would improve habitat quantity and quality for the fishery resources. These measures include a flow management standard, a temperature management plan, temperature objectives, and fish passage at the Nimbus and Folsom Dams. The flow standard would ensure that there would be sufficient flow to maintain quality habitat for steelhead. Because spawning for the listed species often depends on temperature, and high temperatures can kill eggs or delay spawning, efforts to manage water temperatures would have a beneficial impact. Finally, if fish passages were installed in the Nimbus and Folsom Dams, migrating fish species would have access to historical and typically high quality spawning locations upstream. This would likely increase spawning success for these species. Overall, implementing the RPA would have significant beneficial impacts for ESA-listed species in the project area. If the existing weir were not replaced, the continued need to repair this aging structure would impair Reclamation's operational flexibility and ability to meet the terms of the RPA, such as the flow standard, as well as other regulatory requirements.

Land and visitor use plans would help to protect biological resources in the region over the long term. These plans would aim to appropriately manage other land uses, particularly recreation, to have a minimal impact on fishery resources.

The Folsom Dam Safety and Flood Damage Reduction Project would have beneficial impacts on the fishery resources in the area. This project would likely result in more stable water releases from the Folsom Dam downriver to the Nimbus Dam and farther downriver. This would reduce the need for unanticipated releases from the Nimbus Dam, which could disturb habitat downriver.

Climate change is a process influenced by many factors, both natural and man-made. Cumulative effects from climate change that could affect fish and species in the project area include changes in temperature, precipitation, and sea level. Current models predict that the temperatures throughout California are expected to rise. Higher temperatures could affect fish species, particularly spawning. As the spawning and survival of eggs is temperature dependent, increasing temperatures could result in earlier spawning or decreased egg survival. Additionally, higher water temperatures could disrupt the food chain, particularly the food sources for juvenile salmonids, resulting in decreased survival rates.

The models for climate change in California do not predict a change in the total amount of precipitation near the project area, as precipitation levels in this area are highly variable. Instead, due to the predicted increases in temperature, more of the precipitation would fall as rain than snow. If there were less snowfall, then the snowpack would be less, and the snowmelt would likely occur earlier. Altering the spring runoff could have an effect on fish populations. If water levels or flow rates were to change, it may alter the spawning success for fish species or cause them to alter the timing of these activities to coincide with the changed flow rates.

Implementation of the proposed project would not likely add to the climate change of the area.

4.16.3 Biological Resources

Past, present, and reasonably foreseeable actions that are relevant to biological resources management include population growth, recreational use, residential and commercial development, regional planning efforts, and climate change. The types of effects that have occurred and would continue to occur include vegetation removal or disturbance, invasive and noxious weed spread, disruption of wildlife habitats, and pollution of wetlands.

Proposed residential and commercial development near the project area would increase the population and could increase recreationists at Nimbus Shoals. Further, a population increase would increase noise and traffic in the area, potentially causing more habitat disruption.

Land and visitor use plans would help to protect biological resources in the region over the long term. These plans would aim to appropriately manage other land uses, particularly recreation, to have a minimal impact on biological resources.

Definitive effects on biological resources from climate change are speculative at this time and are based on current research. Climate change can affect biological resources by altering the frequency, intensity, duration, and timing of fire, drought, introduced species, and insect and pathogen outbreaks (Dale et al. 2001). Projected increases in temperature could favor some species over others, and invasive plant species could have a competitive advantage. It is unlikely that plants would be able to adapt quickly enough to match the pace of climate changes. Increased temperatures could alter the timing of pollinator life cycles, preventing certain native species from reproducing. Increases in drought could change the natural fire regime by making wildland fires more frequent, causing widespread destruction of vegetation.

Under all alternatives, temporary disturbances to vegetation, wildlife, and habitats would be minimized and fully mitigated through the implementation of environmental commitments (Appendix C). Alternatives 1A and 1C could have a cumulative effect on the federally threatened valley elderberry longhorn beetle; however, with implementation of the Environmental Commitment BIO-10 (Appendix C)**,** these impacts would be fully mitigated. Under all alternatives, cumulative effects would be less than significant.

4.16.4 Recreational Resources

The Hazel Avenue Widening Project began in April of 2009 to widen Hazel Avenue from four to six lanes. As part of this project, the Hazel Avenue Bridge spanning the American River in the project area would also have to be widened, requiring in-river work. This work could result in access constraints to the project area and the Hatchery parking lot. An environmental assessment and EIR for this project were completed and included numerous mitigation measures to ensure that the impacts are less than significant. Work on this project is anticipated to continue through 2011 and to be completed just before the proposed construction period for the Nimbus Hatchery improvements. Additionally, this project includes installation of additional public facilities, including a waterless vault toilet and day use horse stables. Adding these facilities could enhance the conditions for visitors. A portion of the Hatchery parking lot is being used for construction staging for the Hazel Avenue Bridge. Visitors to the project area are already experiencing less availability of parking, and these temporary impacts would continue with the proposed project.

The Lower American River Salmonid Spawning Gravel Augmentation and Side-Channel Habitat Establishment Program is a program that began in September 2008 with the goal of improving the spawning habitat in the lower American River by placing up to 75,000 cubic yards of gravel in seven sites (approximately 10,700 cubic yards per site) and creating three side channels for spawning. Two of these sites are within the project area, approximately 95 yards upstream of the USGS gaging cable and in the stilling basin. The other five sites are downstream of the project area. As steelhead and chinook salmon use areas of the river with gravel streambeds, placing gravel as an optional feature of the proposed project would have a beneficial impact by increasing spawning habitat and therefore increasing sportfishing opportunities.

The American River Parkway Plan provides the management guidance for the American River Parkway, a 29-mile open space greenbelt from the Folsom Dam to the confluence with the Sacramento River. The plan provides for improved recreation at the project area. Implementing this plan would have no adverse impacts on the fishery resources in the planning area, and all alternatives for this project are consistent with these goals.

The Folsom Lake State Recreation Area General Plan/Resource Management Plan also provides for improved recreation within the project area. Therefore, it contributes to beneficial cumulative recreation impacts.

4.16.5 Cultural Resources

Archaeological Resources

Regional projects that involve general planning, such as the Folsom Lake SRA RMP and State Park General Plan, may have beneficial impacts on archaeological resources by providing opportunities for public education. Given the archaeological sensitivity of the region, ground-disturbing projects in the cumulative projects list, such as the Hazel Avenue Widening and the Hazel Light Rail Station TOD projects, may significantly impact archaeological resources. Alternative 1 of the proposed project may contribute to a cumulative impact on the regional archaeology of the Sacramento Valley if the project were to impact unknown or subsurface archaeological resources. It is not expected to impact known archaeological resources near the Hatchery. Alternative 2 and the No Action Alternative are not expected to impact known or unrecorded archaeological resources. Incorporating mitigation, impacts under Alternative 1 would be reduced to less than significant. Therefore, the proposed project is not expected to contribute to cumulative impacts on archaeological resources.

Ethnographic Resources

Like archaeological resources, general planning projects on the cumulative projects list would likely have beneficial impacts on ethnographic resources if they were to provide opportunities for public education.

Historic Architecture

There would be no cumulative impacts on historical architectural resources from other projects because the Nimbus Fish Hatchery complex has been determined by consensus determination with the SHPO to be ineligible for listing on the NRHP.

4.16.6 Geology and Soils

There would be no cumulative impacts on geology or soils from other projects, including the Hazel Avenue Bridge Widening Project or the various projects in the American River, such as the American River Spawning Gravel Project and ongoing improvements to Nimbus Dam. The assumption is that other projects in the area would also implement similar measures to reduce impacts.

Paleontological Resources

Since none of the alternatives are expected to impact paleontological resources, the project is not expected to contribute to cumulative impacts on paleontological resources.

4.16.7 Water Resources

There would be no cumulative effects on water resources or water quality from other projects, including the Hazel Avenue Bridge Widening Project or the various projects in the American River, including the American River Spawning Gravel Project and ongoing improvements to Nimbus Dam. The proposed project would implement BMPs to minimize impacts on water resources. The assumption is that the developers of other projects in the area would also implement similar measures to reduce impacts.

4.16.8 Hazardous Materials

The proposed project area is in the American River Parkway, a greenbelt designated for open space and recreation. Because no substantial future development is proposed in this area, cumulative impacts related to hazardous materials and waste would be less than significant.

4.16.9 Public Health and Safety

Construction of other projects in the area, including improving the Nimbus Dam and widening Hazel Avenue, would present health and safety issues similar to those described in this section. Because each project would be expected to implement safe work practices and to comply with regulations addressing health and safety, cumulative impacts would be less than significant. Some level of health and safety risk is inherent in everyday activities. The proposed project would not contribute significantly to this background risk level. The Folsom Dam Safety and Flood Damage Reduction Project would improve flood safety, security, and hydrologic conditions in the project vicinity, reducing cumulative public health and safety risks over time.

4.16.10 Infrastructure

The proposed project area is in the American River Parkway, a greenbelt designated for open space and recreation. Because no substantial future development is proposed in this area, cumulative impacts related to infrastructure are less than significant.

4.16.11 Energy

The project would increase energy production from the Nimbus Dam power plant. Improvements to Nimbus Dam could increase the efficiency of the dam and further increase power generation.

4.16.12 Air Quality

Cumulative air quality impacts would occur when multiple projects affect the same geographic areas at the same time or when sequential projects extend the duration of air quality impacts on a given area over a longer period of time. The air quality impacts of the proposed project stem primarily from temporary construction. Ozone precursor emissions associated with engine exhaust from construction equipment would contribute slightly to area-wide and regional air quality conditions. Fugitive dust emissions from construction generally would have a more localized impact, with the most noticeable impacts occurring within half a mile or so of the construction site.

The Hazel Avenue widening project would be completed shortly before the start of the Nimbus Hatchery project. The Nimbus Hatchery project would thus extend the duration of construction-related air quality impacts in the hatchery vicinity. But because the incremental air quality impact of the Nimbus Hatchery project is so small under any alternative, there would be a less than significant cumulative impact from the sequence of these two projects.

Other ongoing projects in the area (American River spawning gravel project, Nimbus Dam improvement, and Folsom Dam safety and flood damage reduction project) would overlap in time with the Nimbus Hatchery project. New development under the Hazel Light Rail Station transit-oriented development program could also overlap with the Nimbus Hatchery project. The Folsom Lake SRA RMP and State Park General Plan might also have some facility construction projects that would overlap with the Nimbus Hatchery project. But because the incremental air quality impact of the Nimbus Hatchery project is so small under any alternative, there would be a less than significant cumulative impact from any such overlapping projects.

The American River Parkway Plan does not include any specific facility developments that would overlap with the Nimbus Hatchery project. The Nimbus Hatchery Genetic Management Plan has no identifiable air quality impacts, so there would be no cumulative air quality impacts associated with those two plans.

Because the incremental air quality impact of the Nimbus Hatchery project is so small under any alternative, there would be a less than significant contribution to cumulative impacts on climate change.

4.16.13 Noise

Cumulative noise and vibration impacts occur when multiple projects affect the same geographic areas at the same time or when sequential projects extend the duration of noise or vibration impacts on a given area over a longer period. The noise and vibration impacts of the proposed project stem primarily from temporary construction. Noise and vibration impacts from construction are typically localized and seldom extend more than one to two thousand feet from the construction site. Because vibration impacts from equipment used for the Nimbus Hatchery project would be negligible at off-site locations, there would be no cumulative vibration impacts from the proposed project in combination with other cumulative projects.

The Hazel Avenue Widening Project would be completed shortly before the start of the Nimbus Hatchery project, which would thus extend the duration of construction-related noise impacts in the hatchery vicinity. Because the Nimbus Hatchery project would have a significant noise impact on the nearest homes on the north bank of the American River, the Nimbus Hatchery project, in combination with the Hazel Avenue Widening Project, also would have a significant cumulative noise impact.

Two ongoing projects in the area (American River Spawning Gravel Project and Nimbus Dam improvements) would overlap in time with the Nimbus Hatchery project and might involve activities and equipment operations close enough to the Hatchery to have some cumulative noise impacts. Because the Nimbus Hatchery project would have a significant noise impact at the nearest homes on the north bank of the American River, the Nimbus Hatchery project, in combination with the American River Spawning Gravel Project and Nimbus Dam improvements, also would have a significant cumulative noise impact.

The Folsom Dam Safety and Flood Damage Reduction Project would overlap with the Nimbus Hatchery project but would be too far from the Hatchery to have any cumulative noise impacts. New development under the Hazel Light Rail Station Transit-Oriented Development Program could also overlap construction under the Nimbus Hatchery project, but those developments would be too far from the Hatchery to have significant cumulative noise impacts.

The Folsom Lake SRA RMP and State Park General Plan might also have some facility construction projects that would overlap with the proposed project. But any construction projects under those two plans are expected to be far enough from the Nimbus Hatchery to avoid creating significant cumulative noise impacts in combination with the Nimbus Hatchery project.

The American River Parkway Plan does not include any specific facility developments that would overlap with the proposed project. The Nimbus Hatchery Genetic Management Plan has no identifiable noise or vibration impacts, so there would be no cumulative noise impacts associated with those two plans.

4.16.14 Land Use

The proposed action is consistent with applicable land use plans and policies and would not contribute to cumulative effects on land use.

4.16.15 Visual Resources

Construction projects that create a change in the visual character of the project area would be considered an adverse impact with implementation of the proposed project. The Hazel Avenue Widening Project would create a temporary change in the visual character of the area, during construction and after. These alterations would not cause a substantial visual change because the area is already visually compromised by the built environment, including the existing Hazel Avenue Bridge.

4.16.16 Socioeconomics and Environmental Justice

Cumulative projects, such as the Hazel Avenue Bridge and the light rail stations at Folsom Boulevard in Sacramento County, could result in temporary impacts on the quality of life within the region of influence from lane closures or detours. However, these impacts would be minor and less than significant. Further, none of the alternatives discussed above for the proposed project would result in significant impacts on socioeconomics or environmental justice. Therefore, the proposed project would not contribute to significant adverse cumulative impacts on socioeconomics and environmental justice.

4.17 Growth-Inducing Impacts

Growth-inducing impacts can occur when an action leads to unplanned growth or to growth that occurs faster than envisioned by adopted public plans and policies. Under CEQ regulations, the project effects analyzed in an EIS are as follows:

> 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 (40 CFR, Part 1508.8).

Section 15126.2(d) of the CEQA Guidelines requires that an EIR identify any growth-inducing impacts that may result from a project. The CEQA Guidelines define a growth-inducing impact as follows:

> …the 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 which would remove obstacles to population growth… It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

Induced growth, as defined in this section of CEQA, includes the direct employment, population, or housing growth of a project, as well as the secondary or indirect growth accompanying direct growth. New employees from commercial development and new population from residential development represent direct growth and induce additional economic activity in a given area from the increase in aggregate spending generated as purchases of goods and services. New employment also adds to the demand for local housing, although, since all employees employed in a given community will not necessarily live in that community, this housing demand increase would be less than the increase in employment. A project can induce growth by lowering or removing infrastructure barriers to growth, by improving transportation access to an area, by introducing a new use into an area, or by creating an amenity, such as tourist-oriented facilities, which attract new population or economic activity.

4.17.1 Direct Growth Inducement

Implementing the proposed project would not include new residential or commercial construction, so it would not directly induce population growth. The proposed project would not create additional housing or additional permanent employment, nor would it require that additional housing be developed elsewhere. Temporary employment would be generated during the project's construction phase. However, this would not necessitate the relocation of workers to the project area. Therefore, no direct growth inducement would occur by implementing the Nimbus Hatchery Fish Passage Project.

4.17.2 Removal of Infrastructure or Institutional Barriers to Growth

A project may induce growth by removing an infrastructure barrier to growth. Infrastructure barriers can be both physical (e.g., lack of a road for access or sufficient sewage treatment capacity), or they can be institutional (e.g., the lack of some regulatory condition or capacity) to allow development to occur.

The Nimbus Hatchery Fish Passage Project would not remove infrastructure or institutional barriers, so it would not induce growth by these means.

4.18 Mitigation Measures

During the project planning and design, Reclamation has made a number of environmental commitments to reduce the environmental impacts from the proposed project on the following resources: air quality, biological resources and fisheries, geology and soils, noise, visual resources, and water resources (see Appendix C). These measures are incorporated into the project description along with industry-standard BMPs that would be used to reduce potential impacts during construction and demolition. The mitigation measures described below may be implemented to further reduce the adverse impacts identified for the Nimbus Hatchery Fish Passage Project.

4.18.1 Fisheries

- Develop and implement a fish salvage and rescue program that would help reduce direct take of fish during cofferdam, dewatering, and debris or spill cleanup. The program should require a qualified fish biologist, with all required ESA permits, to oversee field operations and salvage and to determine suitable times and locations to release rescued fish.

- When dewatering, use low-flow pumps with screened intakes to minimize injury and mortality from project construction.

In addition, the following mitigation measure may be implemented under Alternative 1A:

- Prohibit public access to Nimbus Shoals.

4.18.2 Biological Resources

- Before construction begins and during the flowering season (May through October), a qualified biologist would conduct a survey for valley sagittaria in all areas where permanent impacts would occur. If the species were found, Reclamation would consult with the CDFG to determine appropriate mitigation.

4.18.3 Recreation

- To help prevent illegal boating activity, public outreach and education would be conducted to inform the public that boating is not allowed within 1,000 feet of Nimbus Dam for safety and security reasons.

4.18.4 Cultural Resources

- Reclamation would continue to consult with Native Americans. The consultations would allow Reclamation to avoid and address any potential impacts on Native American resources should any be identified through the consultation and planning process.

- To avoid impacts on unanticipated archaeological resources, all work within the vicinity of any potential archaeological finds would be halted until a Reclamation archaeologist could assess the find. Work would not recommence until the requirements of Section 106 (36 CFR, Part 800.13) regarding unanticipated discoveries have been met.

4.18.5 Geology and Soils

Impacts on geology and soils from implementing the Nimbus Hatchery Fish Passage Project would be less than significant; no mitigation measures would be implemented.

4.18.6 Water Resources

Impacts on water resources from implementing the Nimbus Hatchery Fish Passage Project would be less than significant; no mitigation measures would be implemented.

4.18.7 Hazardous Materials

Impacts related to hazardous materials and waste would be less than significant; therefore, no mitigation measures would be necessary.

4.18.8 Public Health and Safety

Impacts on public health and safety would be less than significant; therefore, no mitigation measures would be necessary.

4.18.9 Infrastructure

Impacts related to infrastructure are less than significant, and no mitigation measures would be implemented.

4.18.10 Energy

The Nimbus Hatchery Fish Passage Project would have a net beneficial impact on energy; no mitigation measures would be required.

4.18.11 Air Quality

Impacts on air quality from implementing the Nimbus Hatchery Fish Passage Project would be less than significant; no mitigation measures would be implemented.

4.18.12 Noise

Significant noise impacts would occur from construction equipment operating in the riverbed under Alternative 1A, Alternative 1C, and Alternative 2. It is not practical to provide noise shielding for equipment operating on the riverbed, so there are no practical noise mitigation measures for any of the alternatives.

4.18.13 Land Use

The Nimbus Hatchery Fish Passage Project would not alter land use in the project area; no mitigation measures would be required.

4.18.14 Visual Resources

Impacts on visual resources from implementing the Nimbus Hatchery Fish Passage Project would be less than significant; no mitigation measures would be implemented.

4.18.15 Socioeconomics and Environmental Justice

Impacts on socioeconomics and environmental justice from implementing the Nimbus Hatchery Fish Passage Project would be less than significant; no mitigation measures would be implemented.

5. Summary of Impacts

5.1 Significant Unavoidable Impacts

An EIS must include a description of any significant unavoidable impacts for which no mitigation, or only partial mitigation, is feasible. Significant noise impacts would occur from construction equipment operating in the riverbed under Alternative 1A, Alternative 1C, and Alternative 2. It is not practical to provide noise shielding for equipment operating in the riverbed, so there are no practical noise mitigation measures for any of the alternatives. Significant and unavoidable cumulative noise impacts would also occur because weir demolition would likely overlap with other construction projects in the project area.

5.2 Relationship Between Local Short-Term Uses of the Environment and Long-Term Productivity

NEPA requires that an EIS consider the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.

Implementing the Nimbus Hatchery Fish Passage Project would result in short-term construction-related impacts on water quality, aquatic and terrestrial biological resources, and air quality. In addition, the proposed project would include short-term construction noise, ground disturbance, and construction traffic.

The direct loss of wetlands would eliminate some opportunity for future use and productivity, but impacts would be mitigated during the environmental permitting process. While there would be a short-term direct conversion of habitat for special status fish species, Alternatives 1A and 1C would result in an increase in habitat available to these species.

Additional short-term adverse impacts include the potential for an increase in turbidity, suspended solids, sedimentation, and bank erosion during construction, the potential for accidental spills or seepage of hazardous materials during construction, and fish entrapment or mortality from in-water construction. However, these potential adverse effects would be minimized by implementing the mitigation measures discussed in Section 4.18.1. Moreover, these short-term impacts are expected to be outweighed by long-term beneficial effects of operating a new fish passageway or new diversion weir; either of these operations would have a beneficial impact on all fish species in the lower

American River by eliminating the need to reduce the river flow during weir installation and repair.

5.3 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that this use could have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource, such as energy and minerals that could not be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that could not be restored as a result of the action; an example of this is the extinction of a threatened or endangered species or the disturbance of a cultural resource. The proposed action would not result in a large commitment of nonrenewable resources that would prevent sustainable development.

Construction of the Nimbus Hatchery Fish Passage Project would require the irreversible commitment of fossil fuels (diesel and gasoline), oils, and lubricants used by construction equipment and by workers commuting to and from the site. Construction materials and some equipment that may not be productively recycled would be consumed by the project from construction and operation.

Construction of the project would also require a commitment of a variety of other nonrenewable or slowly renewable natural resources. These resources include lumber and other forest products, sand and gravel, asphalt, metals, and water.

Ongoing operation and maintenance of either a new fish passageway or a new diversion weir would use normal amounts of typical fuels, lubricants, and other nonrenewable consumables. The use of nonrenewable resources under the proposed project would not vary greatly from resource consumption associated with operating the existing diversion weir.

5.4 Comparison of the Environmental Consequences of the Alternatives

The following is a summary of the main environmental impacts described in Chapter 4 that focus on key differences among alternatives, where they exist. The environmental effects of the proposed project alternatives and the No Action Alternative are presented in Table 5-1 at the end of this section. The environmental effects of the programmatic visitor management options are also discussed and are presented in Tables 5-2 and 5-3 at the end of this section.

Fisheries

Under Alternative 1A, there would be impacts on the fisheries in the project area during construction and the operation of the new passageway, from removing the weir, and from increased sportfishing pressures. Removing the weir would allow all spawning fish to enter the Nimbus Dam stilling basin, instead of being directed into the Hatchery at the weir. With the increase in fish densities in the stilling basin, angler success rates are expected to increase, along with the number of anglers using the area, resulting in increased sportfishing pressures on chinook salmon and steelhead in the area. Chinook salmon and steelhead are protected under both the federal and state ESAs, so a significant adverse effect could occur under Alternative 1A, as these protected species would be highly vulnerable to sport fish harvest in the stilling basin under the existing fishing regulations, especially during spawning time. This impact could be mitigated to less than significant by closing public access to Nimbus Shoals.

Continued sportfishing in the area would also result in the potential for increased spread of the New Zealand mudsnail (*Potamopyrgus antipodarum;* NZMS). This invasive species has been identified in the lower American River (CDFG 2008a, 2010). This species of snail is known to spread by attaching itself to the wading boots of anglers and on fishing gear and then unattaching itself in new areas. If the NZMS were accidentally transported to Lake Natoma, upstream of Nimbus Dam, on the clothing or gear of anglers, the water supply would be contaminated.

Infestation of the American River Hatchery, a trout hatchery next to the Nimbus Hatchery, is another concern. Although the American River Hatchery employs strict biosecurity measures, infestation is a possibility. If it were to become infested, the CDFG would have to find a way to completely disinfect it or move it to a new location in order to prevent the spread of the NZMS. Because trout from this hatchery are used to stock areas that do not contain the NZMS, the CDFG would not be able to stock trout until the issue was resolved, which would impact the trout hatchery program across the state. Infestation of the Nimbus Hatchery is a lesser concern because fish entering and exiting the Nimbus Hatchery are returning to anadromous waters in areas where evidence of the NZMS has been found.

Under Alternative 1C, impacts from constructing and operating the fish passageway are similar to those under Alternative 1A, except that impacts from sportfishing would be less than significant due to the change in fishing regulations. Eliminating fishing in the area under Alternative 1C would protect sensitive fish species at critical life stages, likely increasing the number of fish that rear and spawn in the stilling basin. By increasing the overall abundance of fish in the area, the Hatchery would be more likely to meet its production goals, which would be a beneficial impact. Eliminating fishing from Nimbus Dam downstream to the USGS gaging cable would also have the beneficial impact of helping to limit the spread of the NZMS by anglers.

Under Alternative 2, impacts on fisheries would occur during in-water construction, which would occur from June through September over the course of two years. Operating the new diversion weir would have beneficial impacts on the fishery resources in the project area because a new weir would negate the need to reduce river flows to install the weir. Because the new fish-tight weir would reduce the number of adult fish passing up to the stilling basin, there could be less sport fish harvest. Reducing this harvest would have a beneficial impact by reducing mortality and supporting the Hatchery's mission.

Additionally, the new weir would be built to withstand flows of up to 160,000 cfs, which would further reduce the need for major repairs. However, because the new weir would contain more moving parts, maintenance and repair costs would increase, and if any significant damage were to occur, the flow reductions during repairs would likely take longer. The extent of the impacts from these flow reductions would depend on the amount of time required to make the repairs, as well as the time of year when repairs are made.

Under Alternatives 1A and 1C, and to a lesser extent under Alternative 2, removing the aging weir would have the beneficial impact of increasing operational flexibility because the need for flow reductions to install, remove, and repair the weir would be reduced.

Under the No Action Alternative, the fish weir would continue to be used, short duration flow reductions to install the weir each year would continue, and extended flow reductions to perform major repairs after significant flooding would continue. Significant flooding occurs approximately once every ten years. Major repairs require the lowering of water flows to allow in-river construction. Reducing water flow would result in less than significant impacts on fisheries because most flow reductions would last less than one day. However, during significant floods, repairs to the weir may take several days or require reduced flows. Significant floods occur, on average, every ten years.

Biological Resources

Implementing Alternative 1A or Alternative 1C would result in temporary impacts on vegetation and wildlife during construction. Vegetation communities would also be permanently affected by project construction. Approximately 0.1 acre of wetland will be permanently impacted by construction of the fish passageway. Approximately one acre of "other waters" will be temporarily impacted. Impact mitigation would be determined during the consultation process for Clean Water Act Section 404 and 401 and CDFG Section 1602 permits. In addition, environmental commitments, such as BIO-2, BIO-3, and BIO-7 (Appendix C), would mark wetlands, would require the use of a biological monitor, and would develop a wetland mitigation plan, as required. Impacts on wetlands would be less than significant.

Construction under Alternative 1A or 1C would require transplanting one elderberry shrub, the host plant for the threatened valley elderberry longhorn beetle. In addition, a 30-foot buffer around three elderberry shrubs would overlap the construction zone; however, a survey conducted in July 2010 by Reclamation and the USFWS indicated that the construction would likely be able to proceed without impacting the shrubs. All adverse effects on elderberry shrubs would be fully compensated as required through Section 7 consultation and in accordance with USFWS protocols. As a result, the effects on the valley elderberry longhorn beetle would be less than significant.

Fishing closures under Alternative 1C could reduce the number of recreationists at Nimbus Shoals. This would greatly reduce impacts on biological resources in the project area caused by recreationists.

Impacts on vegetation and wildlife from construction under Alternative 2 would be less than under Alternative 1A or 1C because of the smaller construction footprint. No wetlands or elderberry shrubs would be impacted under Alternative 2. Therefore, impacts would be less than significant

Under Alternative 2, impacts on biological resources resulting from recreational use of Nimbus Shoals may decrease due to fewer users. This is because the fish-tight replacement weir would block more adult fish than the existing weir, reducing fishing opportunities.

Recreation

Under Alternatives 1A and 1C, construction would temporarily impact parking in the project area used by recreationists, public access to Nimbus Shoals, and the American River Parkway bike trail. Reclamation would reroute bike trail traffic at times during construction of the portion of the fish passageway next to the CSUS Sacramento Aquatic Center entrance road. Signs would be installed to direct bikers toward the temporary detour. As such, temporary impacts on bike trails would be less than significant. Placing a viewing plaza at the Hatchery would enhance viewing opportunities, resulting in beneficial impacts.

Removing the weir under Alternatives 1A and 1C would not improve or impact boating within the project area. A county ordinance prohibits boating within 1,000 feet of Nimbus Dam. Paddling and rowing watercraft could still be launched from most of the lower American River below the weir, subject to local and seasonal restrictions; therefore, impacts would be less than significant.

Alternative 1C would result in fewer fishing opportunities in the project area. This impact would be less than significant because anglers would still be able to fish in the area west of the USGS gaging station crossing. Although this alternative would result in fewer fishing opportunities in the project area, it would indirectly result in beneficial impacts on this recreation resource by increasing the overall abundance of fish in the area. This would create better sportfishing opportunities within the lower American River.

Construction under Alternative 2 would temporarily impact parking in the project area used by recreationists. Alternative 2 would not provide for the appropriate conditions for hand-launching paddling/rowing watercraft from Nimbus Shoals because boaters could become entrained on the weir.

As the new weir under Alternative 2 would likely decrease numbers of fish passing up to the stilling basin, there could be fewer sportfishing harvest opportunities in the project area between the new weir and the Nimbus Dam. As such, under this alternative, impacts on sportfishing conditions at the project area would be greater than those described under Alternative 1A but would remain less than significant.

Cultural Resources

Reclamation surveyed and evaluated the Nimbus Fish Hatchery complex and determined it to be ineligible for listing on the NRHP. Reclamation would remove the weir as part of the proposed project independent of any changes in fishing regulations made by CDFG. Therefore, the weir was not evaluated for eligibility under the California Register of Historical Resources, only for eligibility under the NRHP. The Nimbus Fish Hatchery complex does not qualify as a historic resource, and there would be no historic architectural resources impacted under Alternatives 1A, 1C, and 2. The SHPO concurred with this determination on September 7, 2010.

Under Alternatives 1A and 1C, there is a potential to significantly impact unrecorded or subsurface archaeological resources in the direct impact zones of the weir, flume, ladder, rock channel, auxiliary water supply pipes, and construction access pathways and staging area on Nimbus Shoals. Mitigation would be implemented to reduce impacts due to unanticipated discoveries to less than significant.

Native American consultations are ongoing and tribal concerns or the presence of ethnographic resources is unknown at this time. Potential impacts could be reduced to less than significant by implementing mitigation as identified by continued consultation.

Geology and Soils

Constructing the proposed project and removing the weir may result in some erosion and loss of topsoil. Best management practices (BMPs), such as using silt fences or straw bales to control erosion, would minimize impacts; all project alternatives would have less than significant impacts.

Erosion resulting from recreational use of Nimbus Shoals may decrease under Alternative 1C and Alternative 2 because there may be fewer users of the shoals with the implementation of fishing closures (Alternative 1C) or reduced fishing opportunities (Alternative 2).

Water Resources

During construction of all project alternatives, there would be an increased potential for water quality degradation due to disturbance of river sediments and silt runoff from disturbed areas. BMPs, such as turbidity curtains, silt fences, or straw bales for erosion control, would be implemented to minimize potential river siltation; impacts would be less than significant.

All project alternatives would also result in some alteration in the geomorphology of the lower American River; impacts would be less than significant.

Water quality degradation resulting from recreational use of Nimbus Shoals may decrease under Alternative 1C and Alternative 2 because there may be fewer users of the shoals with the implementation of fishing closures (Alternative 1C) or reduced fishing opportunities (Alternative 2).

Hazardous Materials

Construction for all project alternatives would require that hazardous materials be transported to, temporarily stored on, and used at the project area. Common hazardous materials that would likely be found at the site during construction are petroleum, oils, lubricants, solvents, and cleaners, primarily used for operating construction equipment. The temporary presence and use of these materials at the project area would increase the risk of a release of hazardous materials to the environment. The risk of fires and explosion hazards would also be increased because flammable and potentially explosive materials would be present at the site during construction. Adverse impacts would be less than significant because construction would comply with all applicable federal, state, county, and municipal laws, ordinances, and regulations and because BMPs including proper handling and storage would be employed. Specific BMPs to be employed are presented in Section 4.7.1.

Public Health and Safety

The temporary presence and use of hazardous materials at the project area increase the risk of accidents that could affect the health and safety of workers and other persons in the vicinity. BMPs would be used to reduce these risks to less than significant.

Under the Alternatives 1A and 1C, the risks associated with installing, removing, and maintaining the weir would be eliminated once the weir is removed. Although some risk of accidents would remain for persons conducting maintenance on the fish passageway, because this would not involve in-river work, the overall impact on worker safety would be beneficial. Under Alternative 2, the magnitude of health and safety risks for maintaining the new weir would be similar to current conditions, due to the institution of safety procedures and use of trained personnel to maintain the weir, so the impacts would be less than significant.

Infrastructure

The proposed action would not substantially increase the demand for utilities or public services, so the impacts would be less than significant. Traffic in the project area would increase during construction; no lanes or roads would need to be closed, and impacts would be temporary and less than significant. Construction would also temporarily impact the availability of parking in the Hatchery parking lot and use of the American River Parkway bike trail; impacts would be less than significant. Temporary construction-related impacts on parking and bicycle and pedestrian access would be less under Alternative 2 than under Alternatives 1A and 1C.

Energy

The proposed action would have beneficial impacts on energy production. Under Alternatives 1A and 1C, the impact on energy production is a gain of 3,723 megawatt-hours (MWh) per year, valued at $186,150 per year. There would be a temporary net loss of energy production of 284 MWH per year during project construction prior to the removal of the diversion weir, valued at $14,200 per year. Under Alternative 2, the gain is 584 MWh per year, valued at about $29,200 per year.

Air Quality

The proposed project would have less than significant impacts on air quality during construction. Impacts would be minimized by implementing BMPs and the environmental commitments (Appendix C).

Noise

Significant noise impacts would occur from construction equipment operating in the riverbed during weir demolition under Alternatives 1A, 1C, and 2, affecting the residents closest to the project area on the north side of the American River. Those noise levels would exceed the land use compatibility criteria of the Sacramento County general plan. It is not practical to provide noise shielding for equipment operating in the riverbed, so there are no practical noise mitigation measures for any of the alternatives. However, it is worth noting that the construction noise impacts under each of the alternatives would be temporary and that none of the alternatives would generate significant noise during evening or nighttime hours; construction noise would be limited to normal daytime work hours under each alternative. Significant cumulative noise impacts would also occur as weir demolition would likely overlap with other construction projects in the project area.

Land Use

The proposed action would not alter land use in the project area.

Visual Resources

The proposed project would have temporary impacts on visual and aesthetic resources during construction; the impacts would be less than significant.

Removing the weir would be beneficial to visual and aesthetic resources under Alternatives 1A and 1C. This is because the weir compromises the visual character of the American River, and its removal would aesthetically enhance the view of the river. The construction of a new fish passageway southeast of Nimbus Hatchery, with a tie-in to the existing fish passageway under this alternative, would not adversely impact visual resources.

Constructing a replacement weir under Alternative 2 would not substantially degrade the visual character of the area. The replacement weir would look different from the existing weir and would be a solid concrete structure, visible at the surface of the river. However, the visual and aesthetic character of the area is already compromised by the built environment and weir.

Socioeconomics and Environmental Justice

During construction, the proposed action would result in a marginal increase in employment. Potential spending by construction employees within the project area could result in a short-term, localized, beneficial economic stimulus over the construction period. After construction, implementing the proposed action would not change employment or business volume. The number of Hatchery employees is not expected to change.

Implementing the proposed action would affect public access to the project area during construction and thus temporarily impact the quality of life of the visitors to the project area. After construction, the new viewing plaza and modified walkway under Alternative 1 would enhance the visitor experience and thus would have a beneficial impact on visitors to the project area.

Under Alternative 1C, completely eliminating fishing in the area between the USGS gaging cable and the Nimbus Dam would reduce sportfishing opportunities in the vicinity. This would impact the quality of life of the visitors to the project area. Under Alternative 2, operating the new diversion weir would impact the quality of life due to possible decreased fishing opportunities.

No environmental justice impacts are expected to occur.

Visitor Management Options for Nimbus Shoals

Under Alternative 1A, visitor use of Nimbus Shoals is expected to increase due to the increased number of fish in the stilling basin and the attraction of the fish passageway. Under Alternative 2, visitor use of Nimbus Shoals is expected to decrease due to the decrease in fish in the stilling basin and resulting decrease in fishing opportunities.

Under either alternative, both the public vehicle with defined parking and walk-in only options could result in decreased visitation. Some visitors could be deterred by the defined parking area and could choose not to visit the area since they could no longer drive to the water's edge. Other visitors could be unwilling to walk to the shoals from the Hatchery parking lot or other nearby parking areas.

Under both Alternative 1A and 2, adverse impacts would be less than significant for the three visitor management options. Beneficial impacts would also occur. Impacts are described in Tables ES-2 and ES-3, in Chapter 4, and in Tables 5-2 and 5-3.

5.5 Conclusions

Based on this EIS/EIR, all project alternatives are anticipated to result in significant adverse impacts on noise. Potentially significant but mitigable to less than significant impacts are expected for cultural resources. Less than significant adverse impacts are expected for biological resources, recreation, water resources, geology and soils, public health and safety, infrastructure, air quality, visual resources, and socioeconomics. No effects are expected for land use and environmental justice.

In addition, implementing Alternative 1A may have significant but mitigable to less than significant adverse impacts on fisheries. Alternatives 1C and 2 would have less than significant adverse impacts on fisheries.

All project alternatives are expected to have beneficial impacts on fisheries, recreation, cultural resources, energy, and socioeconomics. Alternatives 1A and 1C are anticipated to have further beneficial impacts on public health and safety and visual resources. Beneficial impacts on biological resources, water resources, geology and soils are expected under Alternative 1C and Alternative 2.

Under all project alternatives, cumulative effects are expected to be significant for noise. Fisheries, biological resources, recreation, cultural resources, water resources, geology and soils, public health and safety, infrastructure, air quality, visual resources, and socioeconomics are expected to experience less than significant cumulative effects.

Table 5-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
Fisheries	Significant adverse effect mitigable to less than significant/beneficial effect: • Significant increased sportfishing pressure due to more fish in the stilling basin; mitigable to less than significant by closing public access to Nimbus Shoals. • Continued sportfishing would result in potential for increased spread of the NZMS. • Flow would not need to be reduced to install, remove, and repair the weir, resulting in increased operational flexibility and beneficial impacts on fisheries.	Less than significant adverse effect/beneficial effect: • Less than significant increased sportfishing pressure due to fishing closure. • Fishing closure would reduce potential spread of the NZMS. • Fishing closure would likely increase the abundance of fish in the area, helping the Hatchery meet its production goals. • Flow would not need to be reduced to install, remove, and repair the weir, resulting in increased operational flexibility and beneficial impacts on fisheries.	Less than significant adverse effect/beneficial effect: • Reduced numbers of fish in the stilling basin would reduce fish mortality from sportfishing and would support the Hatchery's mission. • Flow would not need to be reduced to install and remove the new weir but would be required for repairs. Increased operational flexibility and beneficial impacts on fisheries would occur, but to a lesser extent than under Alternatives 1A and 1C.	Less than significant adverse effect: • Reduced river flows would continue to be required to install, remove, and repair the weir. • Continued impacts of weir operation on ability of the Hatchery to meet annual production goals.
Biological resources	Less than significant adverse effect: • 0.1 acre of wetlands would be temporarily and permanently impacted. Impacts would be minimized by	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, plus • Reduced visitation at Nimbus Shoals due to	Less than significant adverse effect/beneficial effect: • No wetlands or elderberry shrubs would be impacted. • Impacts on vegetation	Less than significant adverse effect: • Biological resource impacts on Nimbus Shoals caused by recreationists would continue.

Table 5-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	implementing mitigation determined by permitting and environmental commitments (Appendix C). • One elderberry shrub would be transplanted. All adverse effects on elderberry shrubs would be fully compensated. • Vegetation communities would be temporarily or permanently impacted. • Wildlife would be temporarily impacted during construction.	fishing closure would greatly reduce impacts, such as vegetation trampling and wildlife disturbance, by recreationists.	and wildlife from construction would be less than under Alternative 1A or 1C because of the smaller construction footprint. • Reduced visitation at Nimbus Shoals from reduced fishing opportunities would greatly reduce impacts, such as vegetation trampling and wildlife disturbance, by recreationists,.	
Recreation	Less than significant adverse effect/beneficial effect: • Increased fishing opportunities because more fish would be able to move upstream after the weir removal. • Temporary disruptions in parking, access to Nimbus Shoals, and bicycle trail during construction.	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, except • Reduced sportfishing opportunities due to fishing closure. • Indirect beneficial impact by increasing the overall abundance of fish in the area, creating better sportfishing opportunities	Less than significant adverse effect/beneficial effect: • Temporary disruptions would be limited to parking due to reduced construction footprint. • No impact on or improvement in boating opportunities. • Reduced sportfishing opportunities due to reduction in fish in the	No effect.

Table 5-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	• Viewing plaza would enhance fish viewing opportunities. • No impact on or improvement in boating opportunities.	within the lower American River.	stilling basin.	
Cultural resources	Significant adverse effect mitigable to less than significant: • No historical architecture impacts because Reclamation determined the weir and Hatchery do not qualify as a historic resource. The SHPO concurred with this determination on September 7, 2010**.** • Native American consultations are ongoing and tribal concerns or the presence of ethnographic resources is unknown at this time. Potential impacts could be reduced to less than significant by implementing mitigation as identified by continued consultation. • Potential to significantly	Significant adverse effect mitigable to less than significant: • Similar to Alternative 1A.	Less than significant adverse effect: • Similar to Alternative 1A**.** • Potential to impact unrecorded or subsurface archaeological resources would be less than under Alternatives 1A and 1C.	No effect.

Table 5-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	impact unrecorded or subsurface archaeological resources at Nimbus Shoals during construction; can be mitigated to less than significant.			
Geology and soils	Less than significant adverse effect: • Some erosion and loss of topsoil would occur during construction. BMPs would minimize impacts.	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, plus • Erosion resulting from recreation at Nimbus Shoals may decrease with decreased use due to fishing closures.	Less than significant adverse effect/beneficial effect: • Similar to Alternative 1A. • Erosion resulting from recreation at Nimbus Shoals may decrease with decreased use due to the reduced fishing opportunities.	Less than significant adverse effect: • Some erosion and loss of topsoil would continue from recreation at Nimbus Shoals.
Water resources	Less than significant adverse effect: • Increased potential for water quality degradation due to disturbance of river sediments and silt runoff from disturbed areas during construction. BMPs would minimize impacts. • Some alteration in the geomorphology of the	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, except • Water quality degradation resulting from recreation at Nimbus Shoals may decrease with decreased use due to fishing closures.	Less than significant adverse effect/beneficial effect: • Similar to Alternative 1C.	Less than significant adverse effect: • Some water quality degradation would continue from recreation at Nimbus Shoals.

Table 5-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	lower American River. • Increased potential for water quality degradation from increased recreational use.			
Hazardous materials	Less than significant adverse effect: • Temporary presence and use of hazardous materials during construction would increase the risk of a release to the environment. BMPs would minimize risk. • Risk of fires and explosion hazards would increase during construction because flammable and potentially explosive materials would be present. BMPs would minimize risk.	Less than significant adverse effect: • Same as Alternative 1A.	Less than significant adverse effect: • Similar to Alternative 1A, but impacts would be slightly less with reduced construction footprint.	Less than significant adverse effect • Weir would continue to require maintenance and periodic significant repairs, potentially involving the use of hazardous materials, risking a release to the environment. BMPs would minimize risk.
Public health and safety	Less than significant adverse effect/beneficial effect: • Temporary presence and use of hazardous materials during	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A.	Less than significant adverse effect: • Risks for maintaining the new weir would be similar to current conditions due to the	Less than significant adverse effect: • Risks associated with installing, removing, and maintaining the weir would continue.

Table 5-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	construction would increase the risk of accidents that could affect health and safety. BMPs would minimize impacts. • Risk of accidents associated with installing, removing, and maintaining the weir would be eliminated once the weir is removed. Risk of accidents for persons conducting maintenance on the fish passageway would be less than current conditions because it would not involve in-river work.		institution of safety procedures and use of trained personnel.	
Infrastructure	Less than significant adverse effect: • No substantial increase in the demand for utilities or public services. • Temporary traffic increase during construction; no lanes or roads would be closed. • Temporary impact during construction on	Less than significant adverse effect: • Same as Alternative 1A.	Less than significant adverse effect: • Similar to Alternative 1A, but construction-related impacts on parking and bicycle and pedestrian access would be reduced, due to reduced construction footprint.	No effect.

Table 5-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	availability of some parking spaces and bicycle and pedestrian access.			
Energy	Beneficial effect: • Temporary net loss of energy production during project construction before the removal of the diversion weir valued at $14,200 per year. • During operation and maintenance phase, net gain of energy production valued at $171,950 per year.	Beneficial effect: • Same as Alternative 1A.	Beneficial effect: • During operation and maintenance phase, net gain in energy production valued at about $29,200 per year.	No effect.
Air quality	Less than significant adverse effect: • Construction emissions would be minimized by implementing BMPs and environmental commitments (Appendix C).	Less than significant adverse effect: • Same as Alternative 1A.	Less than significant adverse effect: • Construction emissions would be reduced compared to Alternatives 1A and 1C due to the smaller construction footprint.	No effect.
Noise	Significant adverse effect: • During weir demolition, daytime noise levels would temporarily exceed land use compatibility	Significant adverse effect: • Same as Alternative 1A.	Significant adverse effect: • During weir construction and demolition, daytime noise levels would temporarily exceed land use compatibility	No effect.

Table 5-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	requirements for residents closest to the project on the north side of the river.		requirements for residents closest to the project on the north side of the river.	
Land use	No effect.	No effect.	No effect.	No effect.
Visual resources	Less than significant adverse effect/ beneficial effect: • Temporary visual impacts during construction. • Removing the weir would aesthetically enhance the view of the river.	Less than significant adverse effect/ beneficial effect: • Same as Alternative 1A.	Less than significant adverse effect: • Temporary visual impacts during construction.	No effect.
Socioeconomics and environmental justice	Less than significant adverse effect/beneficial effect: • Temporary increase in employment and local business volume during construction. • Temporary reduction in quality of life for visitors due to disruptions in access during construction. • During operation and maintenance, new viewing plaza and	Less than significant adverse effect/beneficial effect: • Same as Alternative 1A, plus • Fishing closure would result in reduced quality of life for visitors.	Less than significant adverse effect/beneficial effect: • Temporary increase in employment and local business volume during construction. • Temporary reduction in quality of life for visitors due to disruptions in access during construction. • Reduced fishing opportunities would result in reduced quality	No effect.

Table 5-1. Summary of Environmental Effects

	Alternative 1A	Alternative 1C	Alternative 2	No Action Alternative
	modified walkway would enhance visitor experience.		of life for visitors.	

Table 5-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
Public safety	Less than significant adverse effect: • Opportunities for drowning and risks to users from flow increase would increase with increased visitation. • Vehicle break-ins and vandalism would increase with increased visitation. • Vehicle-related user conflicts would increase with increased visitation.	Less than significant adverse effect/beneficial effect: • Similar to no change in access except that vehicle-related user conflicts would be reduced compared to no change in access.	Less than significant adverse effect/beneficial effect: • Impacts related to increase in visitation would be reduced compared to no change in access and defined parking area options because visitor numbers would be reduced by their unwillingness to walk in. • Risk to users from flow increases would be reduced because visitors would be more likely to evacuate more quickly if not trying to save a car. • Vehicle break-ins on neighboring roads could	Beneficial effect: • Public safety risks would be greatly reduced.

Table 5-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
			increase because vehicles would be unattended. • Vehicle-related user conflicts would be greatly reduced.	
Operation and maintenance requirements	Less than significant adverse effect: • Need for sanitation facilities and trash removal would increase with increased visitation.	Less than significant adverse effect: • Similar to no change in access. Impacts could be reduced by providing sanitation and trash collection facilities near parking area. • Increased maintenance needs for new facilities.	Less than significant adverse effect: • Similar to defined parking option. • Increase in need for sanitation facilities and trash removal would be reduced compared to no change and defined parking area because visitor numbers would be reduced by their unwillingness to walk in.	Beneficial effect: • Need for trash removal would be greatly reduced.
Security	Less than significant adverse effect: • Incidences of vandalism, illegal parking, illegal fishing, and OHV use in the rock channel portion of the fish passageway would increase with increased visitation; however, existing patrols	Less than significant adverse effect: • Same; no change in access.	Less than significant adverse effect: • Illegal activity would be reduced compared to no change and defined parking area because visitor numbers would be reduced by their unwillingness to walk in. • Vehicle break-ins would	Less than significant adverse effect: • Increase in enforcement would be necessary to maintain closure.

Table 5-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
	should be sufficient to address this.		shift to nearby parking areas.	
Fishery management	Significant adverse effect: • Significant adverse impact from increased sportfishing pressure.	Significant adverse effect/ beneficial effect: • Significant adverse impact from increased sportfishing pressure. • Defined parking would lessen impacts on water quality, resulting in a beneficial impact. • Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.	Significant adverse effect/beneficial effect: • Significant adverse impact from increased sportfishing pressure would be somewhat reduced because visitor numbers would be reduced by unwillingness to walk-in. • No vehicle access would greatly reduce impacts on water quality, resulting in a beneficial impact. • Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.	Beneficial effect: • No access would protect fisheries from sport harvest. • No access would greatly reduce impacts on water quality, resulting in a beneficial impact. • No access would reduce lead sinker accumulation, resulting in a beneficial impact.
Environmental	Less than significant adverse effect: • Litter and garbage accumulation would	Less than significant adverse effect: • Litter and garbage accumulation would	Less than significant adverse effect: • Vehicle-related impacts would be greatly reduced.	Beneficial effect: • Impacts would be greatly reduced.

Table 5-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
	increase with increased visitation. • Vehicle erosion damage, including damage to wetlands, would increase with increased visitation. • Risk of oil and fuel spills entering water would increase with increased visitation.	increase with increased visitation. • Vehicle erosion damage, including damage to wetlands, greatly reduced. • Risk of oil and fuel spills entering water would be greatly reduced.	• Litter and garbage accumulation would be reduced compared to no change and defined parking area because visitor numbers would be reduced by their unwillingness to walk in.	
Recreation	Less than significant adverse effect/beneficial effect: • Fishing and fish viewing would increase during salmon spawning season. • Vehicle-related user conflicts would increase with increased visitation. • No change to boating.	Less than significant adverse effect/beneficial effect: • Fishing and fish viewing would increase during salmon spawning season. • Defined parking area would restrict ability to drive up to water's edge. • Possible new facilities and amenities would enhance visitor experience. • Vehicle-related user conflicts would be reduced, increasing safety and thereby enhancing the visitor	Less than significant adverse effect/beneficial effect: • Walk-in would be viewed as an inconvenience and would reduce visitor numbers. • Fishing and fish viewing would increase during salmon spawning season. • Possible new facilities and amenities would enhance visitor experience. • Vehicle-related user conflicts would be greatly reduced, increasing safety and	Less than significant adverse effect: • Sportfishing and other forms of recreation would not be allowed and would shift to other nearby areas. • Fish viewing would still be available at the Hatchery.

Table 5-2. Alternative 1: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
		experience for some. • No change to boating.	thereby enhancing the visitor experience for some. • No change to boating.	
Related costs	• Operation and maintenance costs would increase as a result of increased need for sanitation facilities and trash removal.	• Capital cost would increase due to construction of ADA improvements. • Capital cost would increase if additional facilities and amenities were provided. • In addition, capital cost would increase in order to develop and maintain the parking area.	• Similar to defined parking, although cost may be reduced because visitor numbers would be reduced by their unwillingness to walk in.	• Law enforcement costs would increase in order to maintain the closure. • Costs related to visitor use, such as trash removal, would be greatly reduced.

Table 5-3. Alternative 2: Summary of Effects of Visitor Management Options for Nimbus Shoals

Impact Category	No Change in Access	Vehicle Access with Defined Parking Area	Walk-in Only	No Public Access
Public safety	Beneficial effect: • Public safety risks would decrease as a result of decreased visitation.	Beneficial effect: • Same as no change.	Beneficial effect: • Similar to no change; public safety risks would be further reduced because visitor numbers would be reduced by their unwillingness to walk in.	Beneficial effect: • Public safety risks would be greatly reduced.
Operation and maintenance requirements	Beneficial effect: • The need for sanitation facilities and trash removal would be less than Alternative 1 as a result of decreased visitation.	Beneficial effect: • Same as no change.	Beneficial effect: • Similar to no change; operation and maintenance effort would be further reduced because visitor numbers would be reduced by their unwillingness to walk in.	Beneficial effect: • Operation and maintenance effort would be greatly reduced.
Security	Beneficial effect: • Enforcement issues, such as vandalism and vehicle break-ins, would decrease as a result of decreased visitation.	Beneficial effect: • Same as no change.	Beneficial effect: • Similar to no change; enforcement issues would be further reduced because visitor numbers would be reduced by willingness to walk-in.	Less than significant adverse effect: • Increase in enforcement necessary to maintain closure.
Fishery management	Less than significant adverse effect: • Sportfishing pressure would be reduced due to	Less than significant adverse effect/beneficial effect: • Sportfishing pressure	Less than significant adverse effect/beneficial effect: • Sportfishing pressure	Beneficial effect: • No access would protect fisheries from sport

	reduced number of fish in the stilling basin.	would be reduced due to reduced number of fish in the stilling basin. • Defined parking would lessen impacts on water quality, resulting in a beneficial impact. • Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.	would be further reduced because visitor numbers would be further reduced by their unwillingness to walk in. • No vehicle access would greatly reduce impacts on water quality, resulting in a beneficial impact. • Installation of interpretive/educational signs could have a beneficial impact if visitors were educated in ways to aid in the recovery of area fish.	harvest. • No access would greatly reduce impacts on water quality, resulting in a beneficial impact. • No access would reduce lead sinker accumulation, resulting in a beneficial impact.
Environmental	Beneficial effect: • All impacts such as trash accumulation, and erosion would decrease as a result of decreased visitation.	Beneficial effect: • Similar to no change, but erosion and water quality impacts from vehicle use would be further reduced..	Beneficial effect: • Similar to defined parking but all impacts would be further reduced because visitor numbers would be reduced by their unwillingness to walk in.	Beneficial effect: • All impacts would be greatly reduced.
Recreation	Less than significant adverse effect: • All uses would continue; however, reduced fishing opportunities would result in decreased visitation.	Less than significant adverse effect/beneficial effect: • All uses would continue; however, reduced fishing opportunities would result in decreased visitation.	Less than significant adverse effect/beneficial effect: • Similar to defined parking, although visitation may be further reduced by their unwillingness to walk in.	Less than significant adverse effect: • All uses would end. Fishers and other recreationists would use other nearby fishing and recreation areas.

		• Visitor experience would be enhanced if additional facilities and amenities were provided.		
Related costs	• Operation and maintenance costs would be reduced because of decrease in public use.	• Capital cost would increase due to construction of ADA improvements. • Capital cost would increase if additional facilities and amenities were provided. • Operation and maintenance costs would be reduced because of decrease in public use.	• Similar to defined parking, although cost may be reduced because visitor numbers would be further reduced by their unwillingness to walk in.	• Law enforcement costs would increase in order to maintain the closure. • Costs related to visitor use, such as trash removal, would be greatly reduced.

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7. List of Preparers

This EIS/EIR was prepared by a team of specialists from Reclamation and CDFG, with technical assistance from Tetra Tech and its subconsultants. Team members are listed below, along with their role in the project and additional information regarding their qualifications, as appropriate.

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Name	Role
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California Department of Fish and Game

Name	Role
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Tetra Tech Consulting Team

Name	Years Experience	Role/Responsibility	Education
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Tetra Tech Consulting Team

Name	Years Experience	Role/Responsibility	Education
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8. Distribution List

Scoping for the draft EIS/EIR began in April 2009. This draft EIS/EIR was provided to individuals from the public, agencies, and organizations listed below.

- National Marine Fisheries Service;
- United States Fish and Wildlife Service;
- United States Army Corps of Engineers;
- California State Clearinghouse; and
- United States Environmental Protection Agency.

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9. Glossary

A-weighted decibel (dBA). A frequency-weighted decibel scale that approximates the relative sensitivity of human hearing to different frequency bands of audible sound.

Ambient air. Outdoor air in locations accessible to the general public.

Ambient air quality standards. A combination of air pollutant concentrations, exposure durations, and exposure frequencies that are established as thresholds above which adverse impacts on public health and welfare may be expected. Ambient air quality standards are set on a national level by the US Environmental Protection Agency; ambient air quality standards are set on a state level by public health or environmental protection agencies, as authorized by state law.

Anadromous. Migrating from the sea to freshwater to spawn. Pertains to animals that live their lives in the sea and migrate to a freshwater river to spawn.

Aquatic. Living or growing in or on the water.

Attainment area. An area considered to have air quality as good as or better than the National Ambient Air Quality Standards. An area may be an attainment area for one pollutant and a nonattainment area for others.

C-weighted decibel (dBC). A frequency-weighted decibel scale that correlates well with the physical vibration response of buildings and other structures to airborne sound.

Cancer. A class of diseases characterized by uncontrolled growth of somatic cells. Cancers are typically caused by one of three mechanisms: chemical-induced mutations or other changes to cellular DNA, radiation-induced damage to cellular chromosomes, or virus-induced infections that introduce new DNA into cells.

Carbon monoxide (CO). A colorless, odorless gas that is toxic because it reduces the oxygen-carrying capacity of the blood.

Carcinogen. A chemical substance or type of radiation that can cause cancer in living organisms.

Community noise equivalent level (CNEL). A 24-hour average noise level rating with a 5 dB penalty factor applied to evening noise levels and a 10 dB penalty factor applied to nighttime noise levels. The CNEL value is very similar to the day-night average sound level (Ldn) value but includes an additional weighting factor for noise during evening hours.

Criteria pollutant. An air pollutant for which there is a national ambient air quality standard (carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, inhalable particulate matter, fine particulate matter, or airborne lead particles).

Critical habitat. Habitat designated by the US Fish and Wildlife Service under Section 4 of the Endangered Species Act and under the following criteria: specific areas within the geographical area occupied by the species at the time it is listed, on which are found those physical or biological features essential to the conservation of the species and that may require special management of protection; or specific areas outside the geographical area by the species at the time it is listed but that are considered essential to the conservation of the species.

Day-night average sound level (Ldn). A 24-hour average noise level rating, with a 10 dB penalty factor applied to nighttime noise levels. The Ldn value is similar to the CNEL value but does not include any weighting factor for noise during evening hours.

Decibel (dB). A generic term for measurement units based on the logarithm of the ratio between a measured value and a reference value. Decibel scales are most commonly associated with acoustics (using air pressure fluctuation data); but decibel scales sometimes are used for ground-borne vibrations or various electronic signal measurements.

Deciduous. Having parts, particularly leaves, that fall off or shed seasonally or at a certain stage of development in the life cycle.

De minimis level. A threshold for determining whether various regulatory requirements apply to a particular action or facility. In an air quality context, de minimis thresholds typically are based on emissions, facility size, facility activity levels, or other indicators.

Emergent vegetation. Plants that are rooted in shallow water and have most vegetative growth above water.

Equivalent average sound pressure level (Leq). The decibel level of a constant noise source that would have the same total acoustical energy over the same time interval as the actual time-varying noise condition being measured or estimated. Leq values must be associated with an explicit or implicit averaging time in order to have practical meaning.

Escapement. That portion of an anadromous fish population that escapes the commercial and recreational fisheries and reaches the freshwater spawning grounds.

Extant. Currently or actually existing.

Extirpated. Local extinction where a species (or other taxon) ceases to exist in the chosen area of study but still exists elsewhere.

Fingerling. Young fish, usually in its first or second year and generally between 2 and 25 centimeters long.

Global warming potential. A relative measure of how much a given compound contributes to global warming as compared to an equivalent amount of carbon dioxide. The global warming potential of a compound is determined by the extent to which it absorbs infrared radiation, the portions of the infrared spectrum in which absorption occurs, and the atmospheric lifetime of the compound.

Greenhouse gas. Compounds that absorb infrared radiation and re-radiate a portion of that radiation back to the earth's surface, thus trapping heat and warming the atmosphere.

Habitat. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

Hazardous air pollutant (HAP). Air pollutants that have been specifically designated by relevant federal or state authorities as being hazardous to human health. Most HAP compounds are designated due to concerns related to carcinogenic, mutagenic, or teratogenic properties, severe acute toxic effects, or ionizing radiation released during radioactive decay.

Herbaceous vegetation. Plants composed of non-woody tissues.

Hertz (Hz). A standard unit for describing acoustical frequencies, measured as the number of air pressure fluctuation cycles per second. For most people, the audible range of acoustical frequencies is from 20 Hz to 20,000 Hz.

Hydrophytic vegetation. Plants that have adapted to living in or on aquatic environments.

Invasive species. An exotic species whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13122, 2/3/99).

Maintenance area. An area that currently meets federal ambient air quality standards but that was previously designated as a nonattainment area. Federal agency actions occurring in a maintenance area are still subject to Clean Air Act conformity review requirements.

Maximum sound pressure level (Lmax). The highest decibel level measured during a stated or implied monitoring period or noise event. The Lmax value recorded by a sound level meter depends on the time factor used for integrating instantaneous sound pressure level measurements. For most modern sound meters, this is 1 second when the instrument is set for the slow sampling rate and 1/8 second when the instrument is set for the fast sampling rate

Mutagen. A chemical substance or physical agent that causes a permanent change to the genes of a cell.

Neotropical migratory bird. Refers to species that nest in North American sites but spend up to six winter months in warmer climates of the Americas, including Mexico and Central and South America.

Nitric oxide (NO). A colorless toxic gas formed primarily by combustion that oxidizes atmospheric nitrogen gas or nitrogen compounds found in a fuel. It is a precursor of ozone, nitrogen dioxide, numerous types of photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids. Most nitric oxide formed by combustion processes is converted into nitrogen dioxide by subsequent oxidation in the atmosphere over a period that may range from several hours to a few days.

Nitrogen dioxide (NO_2). A toxic reddish gas formed by oxidation of nitric oxide. Nitrogen dioxide is a strong respiratory and eye irritant. Most nitric oxide formed by combustion is converted into nitrogen dioxide by subsequent oxidation in the atmosphere. Nitrogen dioxide is a criteria pollutant in its own right and is a precursor of ozone, numerous types of photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids.

Nitrogen oxides (NO_x). A group term meaning the combination of nitric oxide and nitrogen dioxide; other trace oxides of nitrogen may also be included in instrument-based NOx measurements. It is a precursor of ozone, photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids.

Nonattainment area. An area that does not meet a federal or state ambient air quality standard. Federal agency actions occurring in a federal nonattainment area are subject to Clean Air Act conformity review requirements.

Ordinary high water mark (OHWM). The point on the bank or shore up to which the presence and action of water is so continuous or frequent as to leave a distinct mark by erosion, destruction of terrestrial vegetation, or other easily recognized characteristic.

Organic compounds. Compounds of carbon containing hydrogen and possibly other elements (such as oxygen, sulfur, or nitrogen). Major subgroups of organic compounds include hydrocarbons, alcohols, aldehydes, carboxylic acids, esters, ethers, and ketones. Organic compounds do not include crystalline or amorphous forms of elemental carbon (such as graphite, diamond, and carbon black), the simple oxides of carbon (carbon monoxide and carbon dioxide), metallic carbides, or metallic carbonates.

Ozone (O_3). A compound consisting of three oxygen atoms. Ozone is a major constituent of photochemical smog that is formed through chemical reactions in the atmosphere involving reactive organic compounds, nitrogen oxides, and ultraviolet light. Ozone is a toxic chemical that damages various types of plant and animal tissues and causes chemical oxidation damage to various materials. Ozone is a respiratory irritant and appears to increase susceptibility to respiratory infections. A natural layer of ozone in the upper atmosphere absorbs high energy ultraviolet radiation, reducing the intensity and spectrum of ultraviolet light that reaches the earth's surface.

Particulate Matter. Solid or liquid material having size, shape, and density characteristics that allow the material to remain suspended in the atmosphere for more than a few minutes. Particulate matter can be characterized by chemical characteristics, physical form, or aerodynamic properties. Categories based on aerodynamic properties are commonly described as being size categories, although physical size is not used to define the categories. Many components of suspended particulate matter are respiratory irritants. Some components (such as crystalline or fibrous minerals) are primarily physical irritants. Other components are chemical irritants (such as sulfates, nitrates, and various organic chemicals). Suspended particulate matter also can contain compounds (such as heavy metals and various organic compounds) that are systemic toxins or necrotic agents. Suspended particulate matter or compounds adsorbed on the surface of particles can also be carcinogenic or mutagenic chemicals.

Peak particle velocity. A measure of ground-borne vibrations. Physical movement distances are typically measured in thousandths of an inch, and occur over a tiny fraction of a second. But the normal convention for presenting that data is to convert it into units of inches per second.

Percentile sound pressure level (Lx). The decibel level exceeded x percent of the time during monitoring.

Perennial vegetation. Plants with a life cycle extending for more than two years and that continue to live from year to year.

Peroxyacetyl nitrate (PAN). A toxic organic nitrate compound formed by photochemical reactions in the atmosphere. PAN is a strong respiratory and eye irritant, and a strong necrotic agent affecting plant tissues. Also called peroxyacetic nitric anhydride. A number of similar organic nitrate compounds are formed along with PAN during photochemical smog reactions. In relatively remote rural areas PAN and related organic nitrates, together with nitric acid, are often the dominant atmospheric nitrogen compounds generated by photochemical smog reactions.

PM_{10} (inhalable particulate matter). A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 50 microns penetrate the lower respiratory tract (tracheo-bronchial airways and alveoli in the lungs). In a regulatory context, PM_{10} is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 9.5 to 10.5 microns and a maximum aerodynamic diameter collection limit of less than 50 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 10 microns and less than 50 percent for particles with aerodynamic diameters larger than 10 microns.

$PM_{2.5}$ (fine particulate matter). A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 6 microns penetrate the alveoli in the lungs. In a regulatory context, $PM_{2.5}$ is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 2.0 to 2.5 microns and a maximum aerodynamic diameter collection limit of less than 6 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 2.5 microns and less than 50 percent for particles with aerodynamic diameters larger than 2.5 microns.

Precursor. A compound or category of pollutant that undergoes chemical reactions in the atmosphere to produce or catalyze the production of another type of air pollutant.

Raptor. Bird of prey with sharp talons and strongly curved beaks, such as hawks, owls, vultures, and eagles.

Reactive organic compounds (ROC). The most technically accurate term for the organic precursors of ozone and other photochemically generated pollutants. The more commonly used term is reactive organic gases (ROG).

Reactive organic gases (ROG). Organic compounds emitted into the air that have photochemical reaction rates sufficient to be considered precursors of ozone. Organic compounds that are not considered reactive in the lower atmosphere are methane, ethane, acetone, methyl acetate, carbonic acid, ammonium carbonate, methylene chloride, methyl chloroform, and numerous fully saturated chlorofluorocarbon compounds. The term reactive organic compounds (ROC) is technically more accurate since many of the compounds of concern may be present in both gaseous and aerosol states (e.g., as atmospheric aerosols or as liquid films condensed on atmospheric particles in dynamic equilibrium with gas phase vapors). But the acronym ROC is not in common use, and there are far too many acronyms already in use for organic compound emissions.

Redd. Nest made in gravel, consisting of a depression dug by a fish for depositing eggs (and then filled) and associated gravel mounds.

Resident bird. A bird that does not make seasonal migrations.

Riffle. A stream riffle is a shallow stretch of a river or stream, where the current is above the average stream velocity and where the water forms small rippled waves as a result.

Riparian. Situated on or pertaining to the bank of a river, stream, or other body of water. Normally describes plants of all types that grow rooted in the water table or subirrigation zone of streams, ponds, and springs.

Ruderal. A plant species that is first to colonize disturbed lands. Some ruderal invasive species may have such a competitive advantage over the natural species that they may permanently prevent a disturbed area from returning to its original state.

Smolt. Juvenile salmonid one or more years old that has undergone physiological changes to cope with a marine environment, the seaward migration stage of an anadromous salmonid.

Special status species. Federal or state listed species, candidate or proposed species for listing, or species otherwise considered sensitive or threatened by state and federal agencies.

Species abundance. The total number of individuals of a species within a given area or community.

Species diversity. The variety of species present in a given area.

State Implementation Plan (SIP). Legally enforceable plans adopted by states and submitted to the US EPA for approval, which identify the actions and programs to be undertaken by the state and its subdivisions to achieve and maintain national ambient air quality standards in a time frame mandated by the Clean Air Act.

Sulfur dioxide (SO_2). A pungent, colorless, and toxic oxide of sulfur formed primarily by the combustion of fossil fuels. It is a respiratory irritant, especially for asthmatics. It is a criteria pollutant in its own right and a precursor of sulfate particles and atmospheric sulfuric acid.

Sulfur oxides (SO_x). A group term meaning the combination of sulfur dioxide and sulfur trioxide; treated as a precursor of sulfur dioxide, sulfate particles, and atmospheric sulfuric acid.

Teratogen. A chemical substance or physical agent that causes birth defects through abnormal development or malformation of a fetus.

Toxic. Poisonous; exerting an adverse physiological effect on the normal functioning of an organism's tissues or organs through chemical or biochemical mechanisms following physical contact or absorption.

Vehicle miles traveled (VMT). The cumulative amount of vehicle travel within a specified geographical area over a given period.

Vernal pool. A sensitive, ephemeral wetland vegetative community with predominantly low-growing ephemeral herbs. Germination and early growth occur in winter and early spring, often while plants are submerged, and pools dry out by summer.

Wetlands. Permanently wet or intermittently water-covered areas, such as swamps, marshes, bogs, potholes, swales, and glades.

Wildlife corridor. A continuous area facilitating the movement of wildlife through rural or urban environments.

Yearling. A fish that is more than one year old and less than two years old.

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