RECLAMATION

Managing Water in the West

Environmental Assessment

Lower American River Anadromous Fish Habitat Restoration Project

U.S. Department of the Interior
Bureau of Reclamation
Mid Pacific Region

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Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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List of Acronyms and Abbreviations

BA	Biological Assessment
BMP	Best Management Practices
BO	Biological Opinion
CAA	Clean Air Act
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMP	Sacramento Coordinated Water Quality Monitoring Program
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	Carbon monoxide
Corps	US Army Corps of Engineers
CRF	California Red-legged frog

CVFPB	Central Valley Flood Protection Board
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
dB	decibel
DOI	Department of the Interior
DPS	Distinct Population Segment
EA	Environmental Assessment
EFH	Essential Fish Habitat
ESU	Evolutionarily Significant Unit
FISH Group	Fisheries and In-Stream Habitat Working Group
FMS	Flow Management Standard
FONSI	Finding of No Significant Impacts
FWCA	Fish and Wildlife Coordination Act
GGS	Giant Garter Snake
GHG	Greenhouse Gas
IPaC	Information for Planning and Conservation
LAR	Lower American River
L_{eq}	Equivalent sound level
L_{max}	Maximum sound level
LOS	Level of Service
LWD	Large woody debris
MBTA	Migratory Bird Treaty Act
MDM	Mount Diablo Meridian
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	Nitrogen dioxide
NPPA	Native Plant Protection Act
O_3	Ozone
OHWM	Ordinary High Water Mark
OSHA	Occupational Safety and Health Administration
PCE	Primary Constituent Elements
PM	Particulate matter
Quad	Quadrangle
Reclamation	Bureau of Reclamation
ROG	Reactive Organic Gases
RM	River mile
RWQCB	Regional Water Quality Control Board
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	Sulfur dioxide
SPCCP	Spill Prevention Control and Countermeasures Plan
SRA	State Recreation Area
SVAB	Sacramento Valley Air Basin
SWRCB	State Water Resources Control Board

TMDL	Total Maximum Daily Load
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VELB	Valley elderberry longhorn beetle
VOC	Volatile organic compound
WYBC	Western Yellow-billed cuckoo

Section 1 Introduction

In conformance with the National Environmental Policy Act of 1969, 42 U. S. C. § 4431 et seq. (NEPA), as amended, the Bureau of Reclamation (Reclamation) has prepared this Environmental Assessment (EA) to evaluate and disclose potential environmental impacts associated with implementation of the Lower American River (LAR) Anadromous Fish Habitat Restoration Project (Proposed Action)(Figure 1).

This EA describes the existing environmental resources in the project area, evaluates the impacts of the No Action and Proposed Action alternatives on the resources, and proposes measures to avoid, minimize, or mitigate any adverse impacts. This EA was prepared in accordance with NEPA, Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) 1500-1508), and Department of the Interior Regulations (43 CFR Part 46).

1.1 Background

The Central Valley Project Improvement Act (CVPIA), section 3406 (b)(13) directs the Department of the Interior to develop and implement a continuing program for the purpose of restoring and replenishing, as needed, salmonid spawning gravel lost due to the construction and operation of Central Valley Project dams and other actions that have reduced the availability of spawning gravel and rearing habitat in the American River from Nimbus Dam to the confluence with the Sacramento River. This CVPIA program may include preventive measures, such as re-establishment of meander belts and limitations on future bank protection activities, in order to avoid further losses of instream and riparian habitat. The CVPIA Program Environmental Impact Statement (DOI 1999) included habitat restoration projects that are now being analyzed in more detail in this assessment.

The restoration and rehabilitation of spawning and rearing habitat for anadromous fish in the Proposed Action area is a high priority for federal and state resource agencies. The CVPIA 3406(b)(13), the CALFED Bay-Delta Authority's Ecosystem Restoration Program, and other sources have authorized and directed funding for much of the stream channel, floodplain, and riparian restoration work completed to date in the lower American River. Since the late 1990s, anadromous fish have benefited from past and ongoing restoration activities within the lower American River watershed.

During the late 1990s, the Lower American River Task Force was developed to primarily focus on issues related to flood control, and the Sacramento Area Water Forum was developed to primarily focus on securing a reliable water supply and protecting the environmental and aesthetic values of the LAR. Both these groups were comprised of multi-agency and multi-disciplinary people. These groups coalesced in preparing a River Corridor Management Plan in January 2002. The

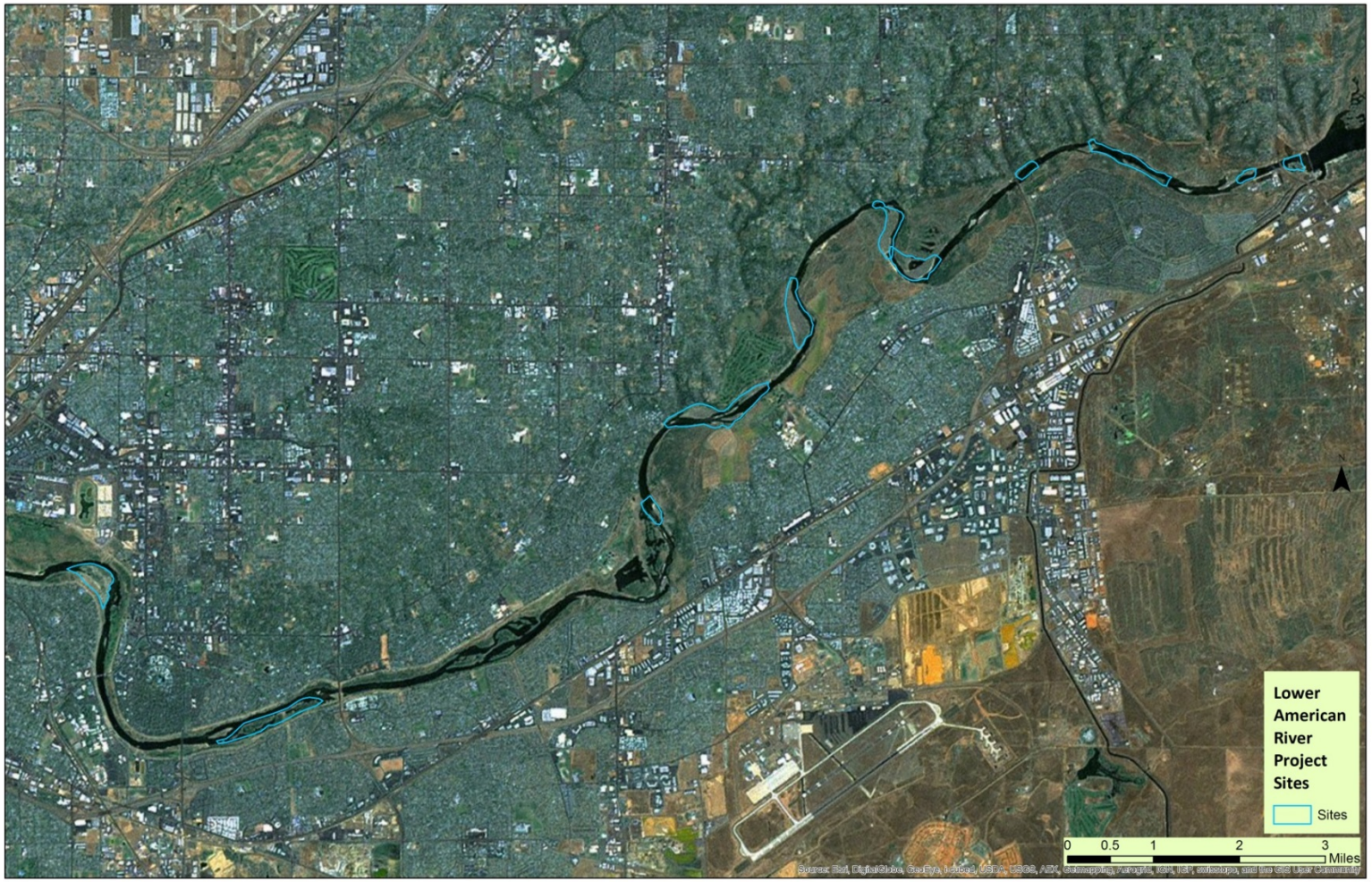
fisheries and instream habitat management portions of the River Corridor Management Plan are presented in the "Initial Fisheries and In-Stream Habitat Management and Restoration Plan for the Lower American River," which was completed by the Lower American River Fisheries and In-Stream Habitat Working Group (FISH Group) in October 2001 (SWRI 2001). Known as the FISH Plan, this document contains recommendations for restoring gravel and side-channel habitats in the lower American River.

In 2008, the Bureau of Reclamation (Reclamation) prepared an EA for the LAR Salmonid Spawning Gravel Augmentation and Side-Channel Habitat Establishment Program (2008 EA)(Reclamation 2008). The work in the 2008 EA was permitted through 2013 for several locations. A Finding of No Significant Impact (FONSI) was signed on August 4, 2008. Reclamation began the gravel and channel habitat work in September 2008 and continued in 2009. In 2010, Reclamation completed a supplemental EA and signed a FONSI to modify its Proposed Action to meet the 2008 EA objectives by including the gravel acquisition site at Sailor Bar which was identified, and analyzed, as an alternative in the 2008 EA. In 2011, Reclamation completed a supplemental EA and signed a FONSI to incorporate woody material into other main channel features to improve Chinook Salmon and steelhead spawning and rearing habitat. A supplemental EA was also completed in 2014, as an informational update of the proposed Program activities for the Nimbus Basin project site that were not completed within the 2008 EA timeframe.

1.2 Purpose and Need for the Project

The purpose of the Proposed Action is to increase and improve Chinook Salmon and steelhead spawning and rearing habitat by replenishing spawning gravel and establishing additional side-channel habitat. The need for the action derives from the declines of naturally spawned salmonid stocks due in part to loss of spawning and rearing habitat through curtailment of gravel recruitment due to blockage of the river channel by dams and the alteration in flow patterns.

Figure 1 - Overview of the lower American River restoration sites



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Section 2 Alternatives Including the Proposed Action

This EA considers two possible alternatives: the No Action Alternative and the Proposed Action. The No Action Alternative reflects future conditions without the Proposed Action and serves as a basis of comparison for determining potential impacts to the human environment that would result from implementation of the Proposed Action.

Identification of the reasonable range of alternatives for this EA was based upon consideration of the need to increase and improve salmon and steelhead spawning and rearing habitat in the American River. Additional alternatives, including varied amounts of gravel, were considered but eliminated due to them being substantially similar in design and effects as the Proposed Action (40 C. F. R. § 1502.14(a)).

2.1 No Action Alternative

Under the No Action Alternative, Reclamation would not place gravel in the American River below Nimbus Dam, nor would side-channels be developed. Spawning and rearing habitat restoration would not occur in this reach of the river, leaving the reach in a deteriorated condition as spawning and rearing habitat for salmonids. Further declines in habitat quality would be likely.

2.2 Proposed Action Alternative

Reclamation proposes to create new side channels, modify existing side channels, and place gravel and instream habitat structure in the American River below Nimbus Dam. The Proposed Action project area encompasses an approximately 21-mile reach of the lower American River and adjacent land between Nimbus Dam (river mile [RM] 23) and the State Route 160 Bridge (RM 2). The Proposed Action area may include Mississippi Bar, above Nimbus Dam, as a gravel source. This area of evaluation is large enough to encompass both the potential direct impacts on listed species and the potential indirect impacts, such as elevated turbidity that may extend beyond the individual project sites.

The project area presents several opportunities for improving and restoring salmonid spawning and rearing habitats. As of 2015, the FISH Group has identified 11 restoration sites (eight locations where future restoration activities and three previously restored locations where maintenance may be needed in the future; Figure 1) that are intended to maintain flexibility for providing salmonid spawning and rearing habitat enhancement through gravel placements and side channel and floodplain enhancements to meet the goals of the CVPIA (b)(13) Habitat Restoration Program. The criteria used to select sites and develop conceptual designs include: biological need, site suitability and access, engineering feasibility, environmental compliance and permitting, gravel

availability and transportation, and cost-benefit. The Proposed Action includes activities applicable to these 11 sites as well as possible unknown sites as described in the following sections.

The proposed activities are designed to minimize potential direct and indirect impacts to listed fish species during construction and installation, while meeting long-term restoration goals established by the FISH Group. Because the anadromous fish species inhabiting the lower American River range throughout the Central Valley, Sacramento-San Joaquin River Delta, San Francisco Bay Estuary, and portions of the Pacific Ocean during their various life stages, meeting these goals would have ecosystem and fisheries benefits that extend well beyond the action area.

Reclamation proposes to create new side channels, modify existing side channels, enhance existing floodplain habitat, and place gravel and woody material in the lower American River below Nimbus Dam. Gravel would be placed to improve spawning at project locations and to replenish spawning gravel downstream that is not replaced by upstream sources. Side channel and floodplain work would be completed to improve juvenile rearing habitat. In the future, the FISH Group may identify additional sites where similar restoration activities (i. e. , similar types, size, and construction methods) would be beneficial.

Instream work would be conducted at time periods to minimize effects on Chinook Salmon and steelhead as specified in permits. Work mobilizing gravel and equipment to the sites could occur outside of fish timing windows, but all work in the water would be confined to timing windows and suitable flows.

Although 11 sites are currently identified for restoration, additional sites could be added using specific criteria developed for the environmental analyses provided in this EA. Restoration activities are anticipated to be completed at up to three sites per year through 2030.In addition to the 11 sites already identified, restoration activities at approximately 15 additional gravel augmentation sites (including riffle supplementation) and 15 additional side channel sites could be completed by 2030.

Designs would be prepared as needed for site specific work. Gravel augmentation would be completed without formal designs at some sites, while sites that incorporate side channel work would include more formal designs. The specific design for each site would be prepared as funding becomes available to conduct the work each year. The fine scale design features would be coordinated with the FISH Group. In the future, the FISH Group may identify additional sites where similar restoration activities (i. e. , similar types, size, and construction methods) would be beneficial.

Gravel Placement

Limitation of suitable spawning substrate has been identified as a limiting factor for anadromous fishes in the lower American River (NMFS 2009). Natural spawning gravel recruitment to the project area is prevented due to upstream dams; therefore, ongoing gravel restoration would occur in several locations in or along the lower American River. There are five specific gravel augmentation projects included in the Proposed Action with a combined total area of approximately 12 acres. In addition to specifically identified restoration projects, the Proposed Action includes potential implementation of similar gravel augmentation activities (i. e. , similar types, size, and construction methods) at currently unspecified locations between Nimbus Dam (RM 23) and State Route 160 Bridge (RM 2). Gravel augmentation would generally be implemented once at each site however, depending on evaluation of monitoring data and judgment of the FISH Group, some sites may not be implemented at all and some may need to be periodically replenished. In a given year, up to three project sites would be implemented with up to 12,000 cubic yards of gravel placed at any one location and up to a total of 36,000 cubic yards for all three sites. Following an adaptive management approach, the FISH Group would select sites for a given year based on the results of ongoing monitoring within the lower American River.

The gravel placed would be uncrushed, rounded "natural river rock" with no sharp edges. It would be a reasonably well-graded mix, designed for spawning use by salmonids, made using an approximately ¼" screen on the bottom. The D_{50} (median diameter of sample) of the mix would be around 1 inch to 1-1/2 inch . The gravel would be processed onsite or prior to delivery to the sites to remove excessive fine materials and minimize introduction of excessive fine sediments into the river. The gravel would be free of oils, clay, debris, and organic material. Materials excavated from side-channel work could be used for onsite gravel placement and sorted as needed to meet design criteria. The larger gravel and cobble resulting from sorting operations would be used as needed to enhance stability of habitat features. Gravel would be sized based on general criteria recommended in a letter to California Department of Fish and Wildlife (CDFW) and Department of Water Resources by the Anadromous Fish Restoration Program (Table 1) (U.S. Fish and Wildlife Service, 2006). The following are the criteria recommended in that letter for targeting Chinook Salmon spawning:

Table 1 - Gravel size criteria

Particle Size (inches)	Percent Passing	Percent Retained
4" or 5"	95%-100%	0%-5%
2"	75%-85%	15%-30%
1"	40%-50%	50%-60%
3/4"	25%-35%	60%-75%
1/2"	10%-20%	85%-90%
1/4"	0%-5%	95%-100%

Source: California Department of Fish and Wildlife 2006.

The size criteria would be refined from these recommendations as needed based on monitoring results. Gravel sizing would vary from these specifications as needed to meet specific project goals such as for stability of material in the river and to provide better habitat for spawning of smaller sized fish such as steelhead or to encourage or discourage spawning in specific areas. Variations from Table 1 would be coordinated with FISH Group and resource agencies to provide the greatest benefit to salmonids.

Stockpile areas would be located within project site boundaries. Existing improved and unimproved roads would be used by transport trucks to deliver gravel to stockpile areas. Stockpile areas adjacent to the river generally would be about one half acre or less and would be placed in existing clearings where ground disturbance would be minimized by using existing dredger tailings or similar type of material.

For purposes of this analysis, tandem transfer trucks (trucks pulling a trailer that can be telescoped into the truck bed) capable of carrying 24 tons per load would be used for transporting gravel to project sites. Single bed off road trucks capable of carrying 12 to 50 tons would be used for transporting gravel within project work sites off of public roads.

Gravel would be placed in the river using dump trucks and front end loaders. At some sites, the substrate would be graded with a bulldozer prior to gravel additions to remove armoring (surface layer of larger rock) or to meet topographic design specifications. A bulldozer would be used to distribute the materials in areas unworkable for loaders. For the gravel placement, front end loaders would pick up a bucket of gravel from the stockpile and drive from the stockpile into the river and carefully dump the gravel in a manner as to distribute it across the river bottom according to design parameters. Placement would proceed starting from the river access site and working out into the river. This would allow the loaders to drive on the newly placed gravel, thereby avoiding driving in overly deep water and distributing fines from the existing substrate. Off-road dump trucks would haul the material into the river in areas where the travel distance to an onshore stockpile is excessively long for multiple loader trips. The loaders would distribute the gravel along the river bottom to create the hydraulic conditions necessary for salmonid spawning. This work would use two or three front end loaders for four to six weeks at a location, dependent on project site. A tracked bulldozer or excavator would be used for grading the existing substrate prior to spawning gravel placement and larger placed rock as needed.

Floodplain and Side Channel Enhancements

Floodplain and side channel habitats serve as important refuge and rearing areas for salmonids and these habitats likely contribute substantially to the productive capacity and life history diversity of Chinook Salmon (Sellheim et. al 2015, Lindley et al.2009, Yoshiyama et al.1998; Martens and Connolly 2014). However, the number and quality of these habitats have been reduced in the

Lower American River as a result of activities such as channel modifications and levee construction (Lindley et al.2009). There are eight specific floodplain and side channel enhancement sites included in the Proposed Action (Figure 1) resulting in up to approximately 43.1 acres of new or re-established floodplain and side channel habitat. In addition to specifically identified restoration projects, the Proposed Action includes potential implementation of similar habitat restoration activities (i. e. , similar types, sizes, and construction methods) at currently unspecified locations between Nimbus Dam (RM 23) and State Route 160 Bridge (RM 2).

Floodplain and side channel habitat enhancements may consist of new or reconnected side channels and floodplain modifications. Spawning habitat would be designed to function optimally under flows within the main channel of 1,750 cubic feet per second (cfs). Floodplain habitat would be designed to inundate incrementally at higher flows. Physical characteristics would be variable with average water velocities ranging between 1.0 fps to 5.0 fps, water depths averaging between one to three feet deep, and channel widths ranging between 12 to 50 feet wide for new channels and potentially larger for existing channels. Water velocities would be designed to be variable and range up to about five feet per second at design flows. Floodplain and side channel habitats would be created, reconnected, or modified by excavation using heavy equipment (i. e. , bulldozer, front end loader, excavator). Where the excavated material is of the appropriate size distribution it would be sorted and placed into side channel or main channel areas to enhance habitat features. The fines would be distributed over the floodplain to assist in revegetating the area. Gravel placed into the main channel may facilitate flow into side channels. Low elevation gently sloping benches would be created along channels in opportune areas to provide juvenile rearing habitat through a range of flows.

Instream Habitat Structure

Large woody debris (LWD)(e. g. , trees, trunks, rootwads, and willows) would be incorporated into the side channels to enhance habitat quality. The woody material would be held in place by partially burying it in the existing substrate or banks or keying into existing material to provide some stability under higher flows.

LWD placement would consist of rootwads or logs partially placed in the channel with one end partially buried in the substrate. Woody material functions to provide rearing habitat by creating diverse cover for rearing juveniles spawning adults. They are also used to scour the channel, creating or expanding pool habitat. Logs with rootwads intact would be positioned with the rootwad end extending down into the pool to create complexity for increasing rearing habitat and maximizing scour.

Due to a desire to create features more similar to naturally occurring woody material, woody material would not be secured to the banks using artificial

materials such as steel cable. The woody material would be keyed into the bank or into placed gravels by partially burying the material in existing soil and rock. Woody material that County Park personnel identify as being a safety hazard would be removed, or moved to a safe location, by existing contractors utilized by county parks for removing in-river hazards. Reclamation would pay for this removal.

Work Windows

Due to the year-round presence of at least one freshwater life stage of listed steelhead in the action area, the use of zones and in-river work windows to entirely avoid and prevent injury or mortality to listed anadromous fish is not possible. However, the least mobile salmonid life stages (i. e. , incubating eggs and pre-emergent fry) are the life stages most likely to experience direct injury and mortality from construction activities. Therefore, instream work would be restricted to July 1 through September 30[1], with consideration of the spatial and temporal distribution of spawning and incubating steelhead, as well as fall-run Chinook Salmon. This in-river work window was selected to avoid potential exposure to spawning or incubating eggs. Construction may be conducted year-round in areas, such as floodplains and side channels, when flowing water is absent due to separation from the main channel by gravel berms that are either naturally present or artificially created.

Eight potential new restoration sites have been identified where floodplain and side channel enhancement and woody material placement activities may occur, and five of these new sites may also include gravel augmentation (Table 2). Additionally, there are three previously restored sites where further restoration may occur (i. e. , Nimbus, Upper Sailor Bar, and River Bend), as well as some other restoration sites that may be identified in the future but the number of additional possible sites is low due to various constraints (Table 2). Floodplains and side channels would be created or modified by excavation with much of the work conducted in areas where fish would not have access (i. e. , areas where flowing water is absent due to separation from the main channel by gravel berms that are either naturally present or artificially created) and instream work would be limited to inlet/outlet areas during the last stage of reconnection to the main channel. Instream habitat structure may be placed as needed where juvenile rearing habitat is identified as limited. Placement of habitat structure in floodplains and side channels would occur in areas where fish would not have access, as described above. Riffle supplementation includes using heavy equipment to perform instream work. Since juvenile steelhead may be present during the in-river work window, conservation measures would be implemented to reduce the potential for adverse effects on juvenile steelhead.

[1] Occasionally exceptions to this period have been granted by NMFS on a case by case basis based on fish presence and the nature of the project. Additional requests for exceptions may occur in the future, most likely in October.

Additional work windows may be necessary for terrestrial species. To avoid impacts to the nesting of migratory birds, vegetation removal would not occur between March 1 and August 31st. Pre-construction surveys would also be conducted before any vegetation removal.

Site Selection

Reclamation has identified the need to combine several restoration actions into one project that would allow for the flexibility to make minor modifications or reprioritize restoration actions based on monitoring results and environmental changes. Spawning and rearing habitat restoration efforts require the flexibility to adopt alternative approaches, as needed, to ensure the success of restoration efforts. This adaptive management approach would enable Reclamation to meet the goals and objectives established by the CVPIA. The focus of the project would be to opportunistically design adaptive strategies to promote dynamic habitat.

The criteria used to evaluate site selection and design, along with possible constraints include: site suitability and access, engineering and design, environmental compliance and permitting, gravel availability and transportation, and cost-benefit. Sites were selected throughout the entire project area that could provide access and maintain flexibility for juvenile salmonid rearing habitat enhancement through long-term gravel replenishment, in-channel gravel placements, and engineered side-channels to meet the needs and goals of the CVPIA program. Additional sites may be selected using the considerations and criteria identified in this EA.

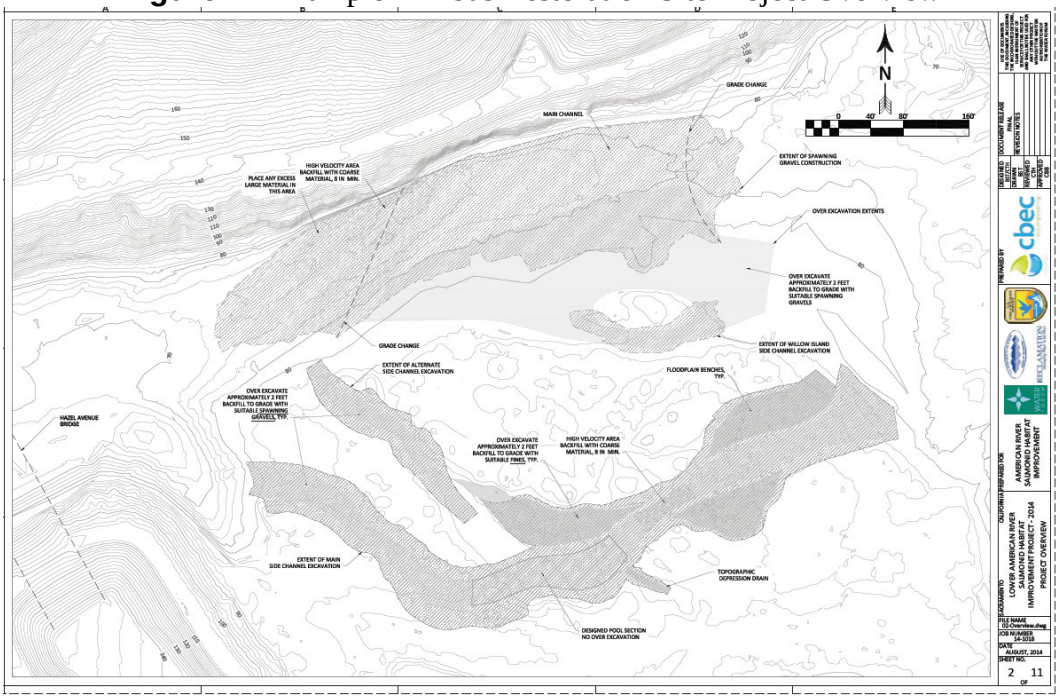
The analysis for NEPA was completed using criteria such as type, timing, duration, size and amount of work for up to three sites per year that fall into these criteria. As project designs are developed for each site, they will be compared with criteria used in this analysis. If they are within the criteria evaluated, then it will be determined that effects are consistent with those analyzed. If the project designs are outside of the criteria, or actions are added that are not described or analyzed in this NEPA document, then Reclamation would need to prepare a supplemental document or change the design of the project to fall within the criteria.

Prior to implementation of restoration activities at each site, Reclamation would ensure the appropriate level of design is developed through modeling, monitoring, and surveying. Reclamation and the FISH Group would guide implementation of an adaptive management program to monitor the physical and biological results to ensure the restoration program achieves the goals of CVPIA. Hydrologic models and biological surveys would be completed before formal design considerations. Sites would be selected and designed to meet the above listed criteria. A site plan document would be developed that includes site specific designs, maps, and figures. The site plan would also include results of surveys and monitoring, and

describe how the site meets the established criteria and avoids additional impacts to the resources.

Detailed designs would be prepared for site specific work as funding becomes available to conduct the work and would be coordinated annually with the FISH Group. An example of a restoration site project overview is presented in Figure 2.

Figure 2 - Example Nimbus Restoration Site Project Overview



Modeling

Topographic site surveys would be conducted before, during and following implementation of restoration activities at the more complex project sites (e. g. side channels). The extent of each project site would be surveyed and X, Y, Z real world coordinates would be provided in sufficient density and extent to enable design and two dimensional hydraulic modeling of project sites to occur. The modeling would enable designs to meet target water depths and velocities to maximize habitat suitability for the target species. Sediment mobility would be estimated to help determine which project features are likely to persist and which areas are likely to experience sediment transport at the modeled flows.

Depending on surveys, some sites may require additional investigations of subsurface materials to determine the depth and volume of gravel material and the location of a hard bedrock layer. This would be accomplished by digging temporary test pits in dry areas prior to design and implementation. Grade checks would be provided during project implementation to assist project personnel in meeting designed elevations. At the completion of project implementation, an as-built survey would be conducted to provide a visual comparison of site elevations to the designed elevations.

Designs would be completed through an iterative process with input from the interagency coordination group to refine project features based on modeling results. The designs would consist of a topographic surface displayed in hard copy design drawings and provided electronically in AutoCAD or ArcGIS. Design drawings would include a project overview displayed on existing topography and/or aerial photography, an overview of the site showing depth of cut and fill, and an overview of the site showing completed elevations. Drawings would include on-the-ground staking to aid in orienting field activities to the design surface. Survey staking would be placed on the ground in coordination with implementation personnel in a configuration to aid in completing the design.

Monitoring

Biological and physical monitoring would be conducted pre- and post-project as a continuing program under CVPIA. The goal of monitoring is to evaluate the effectiveness of the restoration activities at meeting the needs of the targeted species and to validate the design parameters. Monitoring could include spawning surveys, juvenile habitat use surveys, benthic macroinvertebrate surveys, gravel movement surveys, and gravel quality surveys at project sites and at suitable control sites to compare species response before and after completion of each project. Monitoring would be conducted throughout the duration of the project. Monitoring objectives would be refined annually through coordination with the interagency group. Annual monitoring reports are developed by Reclamation and as part of CVPIA with reports being published periodically on the results.

Selected Sites

2.2.1. Site 1, Upper Sunrise – RM 21.5

This site includes a ¾ mile reach of the river between the upper Sunrise side channel and the 2012 gravel placement and side channel creation project and includes the adjacent floodplain along the south side of the river. Previous projects occurred in this reach in 2010 – 2012. The past work included riffle and island creation midway through the reach, side channel reconnection at the downstream end of the reach and gravel placement and side channel creation at the upstream end of the reach. Woody material was placed in the main channel adjacent to the created islands and within the created side channel at the upstream end of the reach. The reach includes a low elevation area along the south side of the river where additional side channel and floodplain habitat could be created. Additional gravel placement could occur at the 2010 – 2011 placement sites to enlarge the site to create a channel spanning riffle. If high flows disconnect the upper Sunrise side channel again, then additional work at the downstream end of the reach would occur to maintain the side channel connection. This side channel was the highest density steelhead spawning area in the river for many years.

2.2.2. Site 2, Sunrise – RM 20.4

The site includes the reach of the river between the Sunrise Boulevard Bridge and the old Fair Oaks Bridge. The area consists of a riffle where heavy salmonid spawning occurs, pool habitat upstream of the riffle, and some low elevation floodplain on the south side of the river. However, a juvenile isolation area is currently within the floodplain. Work at this site would include side channel creation, floodplain modification, and woody material placement along the south side of the river. The isolation risk would be reduced by connecting the isolation area to the river so it remains connected at most flows. Gravel could be placed in the main channel upstream of the existing riffle to increase the amount of spawning and summer steelhead rearing habitat.

2.2.3. Site 3, Sacramento Bar – RM 18.6

The site includes Sacramento Bar and the reach of river adjacent to Sacramento Bar. Sacramento Bar is a slightly perched floodplain where both gravel mining and dredging occurred in the past. The mining left a pond disconnected from the river at all times except for high flows. The river channel at the upstream end of the site receives spawning use, predominantly along the edges of the channel. The spawning habitat consists of predominantly oversized material with most usable sized material along the banks. The project would create side channel and modify floodplain habitat on Sacramento Bar. Gravel from the bar would be sorted and placed in the river channel along the east side of the bar to improve the size distribution of the spawning habitat. Prior to gravel placement the surface layer of larger rock would be pushed into deeper water to provide a consistent material composition more compatible with spawning and egg incubation than the existing armored surface composition.

2.2.4. Site 4, El Manto – RM 17.9

The site includes low elevation floodplain habitat along the left bank of the river and the main channel of the river upstream and downstream of San Juan Rapids. Spawning occurs on the riffles through this reach. The habitat in the center of the channel is armored with material too large for spawning. The project would include side channel creation and floodplain modification along the left bank of the river. An isolation area is near the downstream end of the site. The site connects to the river at around 2,000 – 3,000 cfs so is frequently connected and disconnected from the main channel. This isolation area could be permanently connected to the river channel to provide backwater rearing habitat during the cooler parts of the year. Gravel from the floodplain could be sorted and placed in the river channel to improve the spawning habitat. The riffle downstream of San Juan Rapids includes good depths and velocities for spawning but is all armored so that no spawning can occur. The armor layer would be pushed into deeper water and replaced with a layer of spawning sized material. Woody material would be included in the side channel habitat areas.

2.2.5. Site 5, Ancil Hoffman – RM 15.8

The site includes floodplain area along the right bank of the river. The main channel includes riffle habitat where spawning occurs, mostly along the left bank and adjacent to the island at the upstream end of the site. The project would include side channel creation and floodplain modification along the right bank and gravel placement in the main river channel. The short side channel at the upstream end of the site includes good depths and velocities for spawning but the substrate is mostly too large. The oversized material would be pushed to deeper water or onto the island and replaced with spawning sized material from the floodplain area. The finished side channel would be slightly deeper than the existing channel which is dry at low flows. Woody material would be added to the side channel areas.

2.2.6. Site 6, Upper River Bend – RM 14.5

The site includes a one mile reach of the river between the upstream part of River Bend Park and the downstream end of Ancil Hoffman golf course. The reach includes floodplain area along both sides of the channel. The riffles in this area include low density spawning. Much of the existing habitat is armored with material too large for spawning. Side channel habitat would be created and floodplain habitat modified in the low elevation areas on both sides of the river. Cordova Creek, a tributary entering along the south side of the reach, is the site of another restoration project. Work near the Cordova Creek confluence would be integrated in with the Cordova Creek work. Gravel could be added to the river channel to improve the size distribution of the spawning habitat. Woody material would be included in the side channel habitat.

2.2.7. Site 7, Howe Avenue – RM 8.5

The site includes the low elevation area along the south side of the river between the Watt and Howe boat ramps. It includes existing side channel and backwater habitat that becomes disconnected from the river at lower flow levels. Work at this site would increase the connectivity between the backwater habitat and the river channel so that juvenile rearing can occur at most flows. Isolation areas would be modified to remain connected to the channel or drain to reduce the chance of isolation or stranding of fish. No work would occur in the main channel of the river. Woody material would be included in the side channel habitat.

2.2.8. Site 8, Paradise Beach – RM 5

The site includes a large floodplain area along the left bank of the river upstream of Paradise Beach. Side channel habitat would be created and the floodplain habitat modified so that it becomes inundated over a range of flows. Woody material would be included in the side channel habitat. Isolation ponds are present on the floodplain. These ponds frequently isolate juvenile salmonids. The isolation risk would be reduced by connecting the isolation area to the river so it remains connected at most flows. No work would occur in the main channel. This area becomes inundated by the backwater from the Sacramento River when the Sacramento River flow is greater than about 30,000 cfs at Freeport.

Table 2 – Proposed Action sites

Site	Restoration Type	Method[a]	Approximate Maximum Dimensions[b]	Approximate Maximum Quantity	Frequency	Approximate Duration of Activity
Site 1- Upper Sunrise[d]	Gravel Augmentation; Woody Material	RS, WM	3.5 acres	12,000 yd^3	Once/as needed	4 weeks
	Side Channel/Floodplain Habitat	EX, WM	3 acres	25,000 yd^3	Once/as needed	4 weeks [c]
Site 2- Sunrise	Gravel Augmentation; Woody Material	RS, WM	1.5 acres	7,000 yd^3	Once/as needed	4 weeks
	Side Channel/Floodplain Habitat	EX, WM	1.5 acres	10,000 yd^3	Once/as needed	4 weeks [c]
Site 3- Sacramento Bar	Side Channel Creation/Floodplain Modification	EX, WM	10 acres	50,000 yd^3	Once/as needed	8 weeks [c]
	Gravel Augmentation; Woody Material	RS, WM	1.5 acres	10,000 yd^3	Once/as needed	4 weeks
Site 4- El Manto	Side Channel Creation; Floodplain Modification	EX, WM	7 acres	35,000 yd^3	Once/as needed	8 weeks [c]
	Gravel Augmentation; Woody Material	WM, RS	1.8 acres	10,000 yd^3	Once/as needed	4 weeks
Site 5- Ancil Hoffman	Side Channel Creation; Floodplain Modification	EX, WM	5 acres	30,000 yd^3	Once/as needed	6 weeks [c]
	Gravel Augmentation; Woody Material	WM, RS	1.7 acres	9,000 yd^3	Once/as needed	4 weeks
Site 6- Upper River Bend	Side Channel Creation; Floodplain Modification	EX, WM	7 acres	35,000 yd^3	Once/as needed	8 weeks [c]
	Gravel Augmentation; Woody Material	WM, RS	2 acres	10,000 yd^3	Once/as needed	4 weeks
Site 7- Howe to Watt	Side Channel Reconnection; Woody Material	EX, WM	2.6 acres	10,000 yd^3	Once	4 weeks [c]
Site 8- Paradise Beach	Side Channel Creation; Floodplain Modification; Woody Material	EX, WM	7 acres	35,000 yd^3	Once	7 weeks [c]
Unspecified Locations[e]	Gravel Augmentation	RS, WM	Per site: 12 acres*	12,000 yd^3 per site; 10 sites	Up to once a year, as needed	5 weeks
	Side Channel Creation/Modification; Floodplain Modification	EX, WM	Per site: 7 acres*	4 new/ modified side channels per	Once per site	2-6 weeks [c]
	Woody Material	WM	Per site: 4 acres*	Per Year: 100 log structures; 3 sites	Once	1-3 weeks [c]

[a] Method codes are: RS = Riffle Supplementation; EX = Excavation; WM =Woody Material Placement

[b] Number represents potential project area; the actual project footprint location within the area is unknown but would be smaller.

[c] Values represent overall construction timeframe; actual duration of instream work would be less

[d] This restoration site encompasses three locations where some previous restoration work has occurred.

[e] Three previously restored sites (Nimbus, Upper Sailor Bar, and River Bend; Reclamation 2008) may also need future maintenance consistent with the characteristics identified under unspecified locations .

Section 3 Affected Environment and Environmental Consequences

This section describes the affected environment and evaluates the environmental consequences that may occur with implementation of the Proposed Action and the No Action Alternative.

Effects on several environmental resources were examined and found to be minimal or nonexistent. These resources include seismicity, earthquakes, and subsidence; aesthetics; land use, population and housing; agricultural and forestry resources; socioeconomics; and paleontological resources.

Indian Trust Assets: Indian Trust Assets are legal interests in assets that are held in trust by the United States (U. S.) for federally recognized Indian tribes or individuals. There are no Indian reservations, Rancherias or allotments in the project area. The nearest Indian Trust Asset is the Shingle Springs Rancheria about 17 miles away. The Proposed Action does not have a potential to affect ITAs.

Indian Sacred Sites: Sacred sites are defined in Executive Order 13007 (May 24, 1996) as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, and Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." There are no identified Indian Sacred Sites within the project area of the Proposed Action and therefore this project would not inhibit use or access to any Indian Sacred Sites.

Environmental Justice: Executive Order 12898 requires each Federal agency to identify and address disproportionately high and adverse human health or environmental effects, including social and economic effects of its program, policies, and activities on minority populations and low-income populations. The Proposed Action would not result in any adverse human health or environmental effects to minority or low-income populations.

3.1 Water Resources

3.1.1 Affected Environment

Hydrology

The American River Watershed originates in the northern Sierra Nevada Mountains just west of Lake Tahoe. The upper American River contains three forks (North, Middle, and South) that ultimately converge into the lower American River, a tributary to the Sacramento River.

Folsom Dam, located at on the American River at river mile (RM) 29.4 near Folsom, California, was completed in 1955. It serves to control floodwaters and store surplus winter runoff from the upper American River for fish and wildlife protection, recreation, protection of the Delta from intrusion of saline ocean water, irrigation and M&I water supplies, and hydroelectric power generation. Releases from Folsom Dam are re-regulated approximately seven miles downstream by Nimbus Dam (RM 23). This Central Valley Project facility serves water to M&I users in Sacramento County. Releases from Nimbus Dam to the American River pass through the Nimbus Power plant, or, at flows in excess of 5,000 cfs, the spillway gates. The 23-mile reach of the American River between Nimbus Dam and its confluence with the Sacramento River is commonly referred to as the lower American River, which flows within Sacramento County, California.

Flows in the LAR are controlled by the releases from Nimbus Dam and vary significantly by season and by years. Water that is stored in upstream reservoirs (primarily Folsom Reservoir) during the winter and spring is released in the summer and fall for municipal and industrial supply, irrigation, water quality, power generation, recreation, and fish and wildlife purposes. Consequently the flows are now lower in the winter and spring and higher in the summer and fall than they were prior to the building of the dams and reservoirs.

Releases from Folsom and Nimbus dams are operated under state water rights permit and fish protection requirements. SWRCB Decision (D-893) in 1958 required minimum flows of 250 cfs from January through mid-September and 500 cfs between mid-September through December 31st.

The Sacramento Area Water Forum in cooperation with Reclamation, NMFS, USFWS, and CDFW developed Flow Management Standard (FMS) for the LAR. The FMS regulates flows in the lower American River below Nimbus Dam, establishing Minimum Release Requirements from 800 to 2,000 cfs. The FMS also included the lower American River Group to coordinate fishery and operational requirements. The FMS was included in the NMFS 2009 Biological Opinion on the Long-Term Operations of the Central Valley Project and State Water Project Reasonable and Prudent Alternative actions.

Water Quality

The main sources of water in the American River below Nimbus Dam are rain and snowmelt that collect in upstream reservoirs and are released in response to water needs or flood control. 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 existing beneficial uses, including: municipal supply, contact and non-contact 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. The quality of surface water downstream of Nimbus Dam is also influenced by other human activities along the river downstream of the dam, including historical mining, agricultural, and municipal and industrial (M&I) activities.

In May 1991, the Sacramento Regional County Sanitation District, the County of Sacramento Department of Water Resources and the City of Sacramento jointly established the Sacramento Coordinated Water Quality Monitoring Program (CMP) to conduct water quality monitoring in the Sacramento and American Rivers. The CMP has routinely monitored the lower American River for heavy metals content and for compliance with conventional water-quality parameters. Monitoring has shown that water quality generally meets ambient water-quality criteria for aquatic life protection. Specifically, CMP data for the 1992–1995 monitoring period indicate a mean total suspended solids content of less than 1 mg/L (milligrams per liter), mean electrical conductivity of 52 micro Siemens per centimeter (µS/cm), and a hardness of $CaCO_3$ of 25 mg/L (Sacramento County Water Agency 1995). Nevertheless, through its Resolution No.98-055 (1998) and its CWA Section 303(d) efforts, SWRCB named the lower American River as impaired because of group "A" pesticides, mercury, and unknown toxicity and assigned low, medium, and low priority rankings, respectively, for the development of corresponding total maximum daily load (TMDL) programs (Corps et al.2002).

Water temperature in the lower American River is controlled by releases from Folsom Reservoir. On June 4, 2009, NMFS issued a biological opinion (BO) for listed anadromous fishes and their critical habitats governing the coordinated long-term operation of the Central Valley Project and State Water Project that included water temperature requirements from May 15 through October 31 for juvenile steelhead rearing.

State and federal law mandates a series of programs for the management of surface water quality. In the State of California, water resources are protected under the federal Clean Water Act (CWA) and the State Porter-Cologne Water Quality Control Act, which created the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs). Each RWQCB is responsible for preparing and updating a water-quality control plan (basin plan) every three years; the basin plan for a specific region identifies water quality protection policies and procedures for that region (California RWQCB, 1998).

In the project area, the Central Valley RWQCB is responsible for designating beneficial uses for waters of the American and Sacramento River basins and the Delta that are protected by a range of Central Valley RWQCB programs that specify waste discharge requirements for discharges of wastes to land or water and authorize discharges under the National Pollution Discharge Elimination

System permitting process, pursuant to the federal CWA with oversight by the Environmental Protection Agency.

The Central Valley RWQCB also establishes water quality objectives for the American and Sacramento River basins and the Sacramento–San Joaquin Delta intended to support the protection of beneficial uses.

Reclamation would implement the project in accordance with the following permits that are protective of water quality: a Clean Water Act §401 Certification issued by the Regional Water Quality Control Board; and a Clean Water Act §404 Permit issued by the U. S. Army Corps of Engineers.

3.1.2 Environmental Consequences

No Action Alternative
Under the No Action Alternative, there would be no impacts to water resources since no construction would take place. The existing conditions would continue.

Proposed Action
Hydrology
The hydrologic effects of the proposed actions are limited to changes in water surface elevations resulting from the introduction of the gravel and redirection of some flow from the main river down the proposed side-channels.

The project design process would include modeling of water surface elevation comparing current condition to the completed project condition. The sites with formal designs will be designed to be flood neutral such that under flood flow conditions changes in water surface elevation will be negligible. Modeling of side channel project designs will include estimates of particle mobility through the site. This will provide information on areas that could see increased scour or bedload movement. Project designs at sites with detailed designs will take this into account to design configurations that minimize effects of scour and, where needed, include provisions such as larger rock on areas of increased particle transport potential.

Topographic site surveys would be conducted before and after the more complex project sites (e. g. side channels). The extent of project sites would be surveyed and X, Y, Z real world coordinates would be provided in sufficient density and extent to enable design and two dimensional hydraulic modeling of project sites to occur. Grade checks would be provided during project implementation to assist project personnel in meeting designed elevations. At the completion of project implementation an as-built survey would be conducted to provide a visual comparison of site elevations to the designed elevations.

Project designs would be completed through an iterative process with input from the interagency coordination group. The interagency group would finalize the project sites and develop design parameters. Iterative modeling would be used to

fine tune project features to meet species requirements based on habitat suitability criteria. The designs would consist of a topographic surface displayed in hard copy design drawings and provided electronically in AutoCAD or ArcGIS. Design drawings would include a project overview displayed on existing topography and/or aerial photography, an overview of the site showing depth of cut and fill, and an overview of the site showing completed elevations. Drawings would include on-the-ground staking to aid in orienting field activities to the design surface. Survey staking would be placed on the ground in coordination with implementation personnel in a configuration to aid in completing the design.

Water Quality

The Proposed Action would be completed in accordance with permit conditions and BMPs to protect water quality. These practices would prevent sediments, fuels, hydraulic fluids, hazardous material, and other pollutants from entering the river, and control turbidity within acceptable levels.

Gravel placed in the river would come from onsite sources or from a commercial source and would be processed to maintain a desired particle size distribution. Some turbidity is expected and would be monitored in accordance with relevant permits. If turbidity levels exceed permit standards, work instream would be slowed or suspended until the standards are met. Instream work associated with placing the gravel in the river would likely result in short-term turbidity plumes immediately downstream of the construction area, within the permitted limits. Plumes in flowing water would subside within a few minutes after instream activities cease.

The re-suspension and deposition of instream sediments is an indirect effect of construction equipment and gravel entering the stream. Suspended solids and turbidity generally do not acutely affect aquatic organisms unless they reach extremely high levels (i. e., levels of suspended solids reaching 25 mg/L). At these high levels, suspended solids can adversely affect the physiology and behavior of aquatic organisms and may suppress photosynthetic activity at the base of food webs, affecting aquatic organisms either directly or indirectly (Alabaster and Lloyd 1980). Gravel placed in the stream would be screened and/or washed to maintain water quality standards prescribed in permits. Furthermore, a Clean Water Act § 401Water Quality Certification would likely limit the potential effects of fine sediment on fish by limiting the increase in turbidity over background levels.

BMPs to control erosion and storm water sediment runoff would be implemented including, but not limited to, straw bales, straw wattles, silt fences, and other measures as necessary to minimize erosion and sediment-laden runoff from project areas.

Equipment would not operate in an active stream channel except as necessary to conduct temporary stream crossings and place spawning gravel and in-stream

habitat structure. When in-channel work is unavoidable, clean spawning gravel would be used to create a pad in the channel from which equipment would operate. In-stream construction would proceed in a manner that minimizes sediment discharge. Stream crossings within the main channel would be designed to ensure that conditions are maintained for effective upstream and downstream fish passage, at all times and under all flow conditions. Stream crossings or instream work that may cause turbidity within 200 feet upstream of active spawning and redds would be avoided.

The amount of sediment that may be re-suspended during project installations is not likely to be significant; any re-suspension and re-deposition of instream sediments is expected to be localized and temporary and would not reach a level that would acutely affect aquatic organisms

Best Management Practices

- During in river work, turbidity would be monitored and construction curtailed if turbidity exceeds criteria established by the Regional Water Quality Control Board.
- Work would be completed in compliance with Clean Water Act §401 permits.
- All equipment working within the stream channel would be inspected daily for fuel, lubrication, and coolant leaks; and for leak potentials (e. g. cracked hoses, loose filling caps, stripped drain plugs); and all equipment must be free of fuel, lubrication, and coolant leaks.
- Vehicles or equipment would be washed and cleaned only at approved off-site areas.
- All equipment would be cleaned prior to working within the stream channel to remove contaminants that may enter the river and adjacent lands.
- All equipment would be fueled and lubricated in a designated staging area located outside the river channel.
- Spill prevention kits would be in close proximity to construction areas, and workers would be trained in their use.
- Gravel would be processed as needed prior to being placed in the river.

The Proposed Action is expected to provide beneficial impacts to long-term sediment transport and spawning gravel recruitment downstream. Impacts of potential increased turbidity are expected to be insignificant due to timing of gravel augmentation to avoid sensitive life stages and implementation of BMPs.

3.2 Biological Resources

3.2.1 Affected Environment

The upper reaches of the lower American River are not restricted by levees and the river channel is controlled by natural bluffs and terraces. Levees have been

constructed along the banks for approximately 13 miles upstream of the confluence with the Sacramento River (Reclamation et al.2006).

Most of the lower American River is encompassed by the American River Parkway, which preserves the surrounding riparian zone (Reclamation et al.2006). Vegetation communities along the lower American River downstream of Nimbus Dam include freshwater emergent wetland, riparian forest and scrub. Oak woodland and annual grassland are present in the upper, drier areas farther away from the river. The current distribution and structure of riparian communities along the river reflects the human-induced changes caused by activities such as gravel extraction, dam construction and operations, and levee construction and maintenance, as well as by both historical and ongoing streamflow and sediment regimes, and channel dynamics.

In general, willow and alder tend to occupy areas within the active channel of the river that are repeatedly disturbed by river flows, with cottonwood-willow thickets occupying the narrow belts along the active river channel (Reclamation et al.2006). Typical species in these thickets include Fremont cottonwood, willow, poison oak, wild grape, blackberry, northern California black walnut, and white alder.

Cottonwood forest is found on the steep, moist banks along much of the river corridor (Reclamation et al.2006). Valley oak woodlands occur on upper terraces where fine sediment and adequate soil moisture provide a long growing season. Live oak woodland occurs on the more arid and gravelly terraces that are isolated from the fluvial dynamics and moisture of the river. Annual grassland occurs in areas that have been disturbed by human activity and can be found in many areas within the river corridor.

The cottonwood-dominated riparian forest and areas associated with backwater and off-river ponds are highest in wildlife diversity and species richness relative to other river corridor habitats (Reclamation et al.2006). More than 220 species of birds have been recorded along the lower American River and more than 60 species are known to nest in the riparian habitats. Typical species that can be found along the river include great blue heron, mallard, red-tailed hawk, American kestrel, California quail, killdeer, belted kingfisher, western scrub-jay, swallows, and American robin. Additionally, more than 30 species of mammals reside along the river, including skunk, rabbit, raccoon, squirrel, vole, muskrat, deer, fox, and coyote. Reptiles and amphibians that occupy riparian habitats along the river include western toad, Pacific tree frog, bullfrog, western pond turtle, western fence lizard, common garter snake, and gopher snake (Reclamation 2005a).

Backwater areas and off-river ponds are located throughout the length of the river, but occur predominantly at the Sacramento Bar, Arden Bar, Rossmoor Bar, and between Watt Avenue and Howe Avenue (Reclamation 2005a; Reclamation et al.2006). Plant species that dominate these backwater areas include various

species of willow, sedge, cattail, bulrush, and rush. Riparian vegetation around these ponded areas is composed of mixed-age willow, alder, and cottonwood. These backwater ponds may be connected to the river by surface water during high winter flood flows and by groundwater during other times of the year.

The riparian vegetation of the LAR includes several invasive plant species (County of Sacramento 2008). Species such as Chinese tallowtree, giant reed, pampasgrass, Spanish broom, red sesbania, Himalayan blackberry, and tamarisk are expanding along the riparian areas of the LAR.

Special Status Species

Special-status species addressed in this section include plants and animals that are legally protected or are otherwise considered sensitive by Federal, State, or local resource conservation agencies and organizations. These include species that are State listed and/or Federally listed as rare, threatened, or endangered; those considered as candidates or proposed for listing as threatened or endangered; and plants considered by the California Native Plant Society (CNPS) to be rare, threatened, or endangered.

Rare and Endangered Plants

The Native Plant Protection Act (NPPA) of 1977 protects rare and endangered plants in California and prohibits take of endangered or rare native plants. The NPPA allows for some exceptions through consultation with CDFW, under Fish and Game Code Section 1900 et seq. Under the California Rare Plant Rank the federally threatened and state endangered Slender Orcutt grass and state endangered Boggs Lake hedge-hyssop are listed as 1B (Plants Rare, Threatened, or Endangered in California or Elsewhere). CNPS further designates the level of endangerment with a Threat Rank, with .1 meaning a plant is seriously threatened, a rank of .2 means fairly threatened, and a rank of .3 means not very threatened in California. The following is a list of rare and endangered plants with recorded occurrences surrounding Quads:

- Sacramento Orcutt grass (*Orcuttia viscida*) 1B.1 – Federally endangered
- Slender Orcutt grass (*Orcuttia tenuis*) 1B.1 – Federally threatened
- Boggs Lake hedge-hyssop (*Gratiola heterosepala*) 1B.2
- Sanford's arrowhead (*Satittaria sanfordii*) 1B.2

Species located within the surrounding Quads but above Folsom Dam include El Dorado Bedstraw (*Galium californicum sierrae*), Layne's Ragwort (*Senecio layneae*), Pine Hill Ceanothus (*Ceanothus roderickii*), Pine Hill Flannelbush (*Fremontodendron californicum decumbens*), Stebbins' Morning-glory (*Calystegia stebbinsii*) (CNPS 2015).

Migratory Bird Treaty Act

A list of bird species with recorded occurrences within the surrounding quads was also obtained from the CNDDB (2015). The list was compared to USFWS's list of protected species under the Migratory Bird Treaty Act (MBTA) of 1918

(2015a). Protected migratory bird species with recorded occurrences in the Proposed Action project area are included in Table 4.

Threatened or Endangered Species

The USFWS and NMFS have jurisdiction over federally listed threatened and endangered species. An endangered species is defined as "…any species which is in danger of extinction throughout all or a significant portion of its range. " A threatened species is defined as "…any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (Title 16 USC Section 1532). Section 9 of the ESA makes it illegal to "take" (defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in such conduct") endangered and threatened species (16 USC 1538).

A special-status species list was generated from USFWS's Information for Planning and Conservation (IPaC) website for Sacramento County, on January 11, 2016(USFWS 2016). The following Table 3 includes those federally listed species with recorded occurrences within the surrounding United States Geological Survey (USGS) 7.5-minute Quadrangles based on the California Natural Diversity Database (CNDDB), queried on January 14, 2016. The table also includes the species' status, determination of effects from the Proposed Action, and a summary of the rationale supporting the determination.

Table 3 - Special Status Species in Surrounding USGS Quadrangles

Common Name	***Scientific Name***	***Status[1]***	***Effect[2]***	***Summary of Effects Determination[3]***
Invertebrates				
Conservancy fairy shrimp	*Branchinecta conservatio*	E	NE	Occurences[4] and Critical Habitat outside of the Project area. Occurs only in vernal pools and swales. Vernal pools located approximately 1 mile south of the LAR near Mather Airport. Unlikely to occur due to lack of suitable habitat.
Vernal pool fairy shrimp	*Branchinecta lynchi*	T, X	NE	
Vernal pool tadpole shrimp	*Lepidurus packardii*	E, X	NE	
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	T, X	NLAA	Elderberry shrubs are present along the river corridor. No elderberry shrubs would be disturbed.
Birds				
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	T	NLAA	Proposed Critical Habitat is the Sutter Bypass. No suitable breeding habitat.
Least Bell's vireo	*Vireo bellii pusillus*	E	NE	Historically, the northern end of distribution included Red Bluff. Currently distribution is limited to southern California (USFWS 1998).
Amphibians				

California tiger salamander	*Ambystoma californiense*	T	NE	Found in annual grasslands, grass understory of valley foothill woodland, and uncommonly along streams. Breed and lay eggs in vernal pools and other temporary ponds. Unlikely to occur due to lack of suitable habitat.
California red-legged frog	*Rana draytonii*	T	NE	Red-legged frogs require variety of habitat types including aquatic, riparian and upland areas. Adults often utilize dense, shrubby or emergent vegetation closely associated with deep-water pools with fringes of cattails and dense stands of overhanging vegetation such as willows.
Reptiles				
Giant garter snake	*Thamnophis gigas*	T	NE	The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low-gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields. Unlikely to occur due to lack of suitable habitat.
Fish				
Delta smelt	*Hypomesus transpacificus*	T	NE	Occurs in Sacramento/San Joaquin Delta. No water quality impacts to the Delta
Green Sturgeon	*Acipenser medirostris*	T	NE	Biological Assessment sent to NMFS and Biological Opinion received.
Central Valley steelhead	*Oncorhynchus mykiss*	T, X	LAA	
Central Valley spring-run Chinook Salmon	*Oncorhynchus tshawytscha*	T, X	NLAA	
Winter-run Chinook Salmon	*Oncorhynchus tshawytscha*	E	NLAA	

1 Status = Listing of Federally special status species
E: Endangered; T: Threatened; X: Designated Critical Habitat
2 Effects = Effect determination
NE: No Effect to federally listed species anticipated from the Proposed Action.
NLAA: Not Likely to Adversely Affect with Environmental Protection Measures
3 Summary of rationale supporting determination
4 California Natural Diversity Database 2014 recorded occurrences in the surrounding 18 Quads

Vernal Pool Species

Vernal pools are ephemeral wetlands that fill during the rainy season and disappear during the dry season. During the time water is present they provide unique habitat for species like vernal pool fairy shrimp, vernal pool tadpole shrimp, and Sacramento Orcutt grass. Revised critical habitat for vernal pool

crustaceans was designated on August 11, 2005 (70 FR 46923). There is no Critical Habitat for vernal pool species within the Proposed Action area. Critical Habitat is located approximately 1 mile south of the LAR near Mather Airport.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)
VELB is listed as threatened under the ESA (45 FR 52803). On October 2, 2006, USFWS, in their 5-year review, recommended for this species to be removed from the endangered species list (U. S. Fish and Wildlife Service 2006). USFWS withdrew the proposed rule to remove VELB from the endangered species list on September 17, 2014. Best available science indicated that threats to the species and its habitat have not been reduced to the point of delisting. The CALFED Bay-Delta Ecosystem Restoration Program Plan's *Multi-Species Conservation Strategy* designates the valley elderberry longhorn beetle as a Recovery species (CALFED Bay-Delta Program 2000), which establishes a goal to recover the species.

Distribution of VELB is typically based on the occurrence of elderberry shrubs (*Sambucus* spp.), an obligate host plant, which are known to occur along riparian corridors on the Sacramento River. Much of the typical floodplain habitat has been developed, or converted through the construction of dams and levees. The greatest historical threat to the valley elderberry longhorn beetle has been the elimination, loss, or modification of its habitat by urban, agricultural, or industrial development and other activities that reduce or eliminate its host plants (Talley et al.2006). Nonnative invasive insects have been identified as potential threats to VELB through predation and competition (Talley et al.2006). Invasive plant species may have significant indirect impacts by affecting elderberry shrub vigor and recruitment, impairing elderberry germination or establishment, or elevating fire risk (Talley et al.2006).

Conservation Guidelines for the Valley Elderberry Longhorn Beetle were established by USFWS in 1999 (U. S. Fish and Wildlife Service 1999). The guidelines were designed mainly to mitigate development-related impacts on VELB.

Western Yellow-billed Cuckoo (*Coccyzus americanus*)
Western Yellow-billed cuckoo (WYBC) require large dense canopy of willow and cottonwoods for nesting habitat and rarely nests at sites less than 50 acres (Laymon and Halterman 1989). The optimal size for nesting habitat is greater than 200 acres and anything less than 37 acres is considered unsuitable. Stopover and foraging sites are found in small groves or strips of trees sometimes less than 10 acres and may lack understory. Adults typically arrive in California around June and depart the breeding grounds by mid-September. The young have one of the shortest nesting cycles of any bird species, fledging in as little as 17 days from the times the eggs are laid. Critical Habitat was proposed for WYBC on August 15, 2014. The nearest proposed Critical Habitat unit is CA-3 located near the Sutter Bypass in Sutter County, California.

California Red-Legged Frog (*Rana aurora draytonii*)
California red-legged frog (CRF) habitat consists of pools, slow-moving streams, and stock ponds with fairly dense bank cover. In addition to aquatic habitat, CRF require riparian and upland habitat types. Preferred habitat includes deep-water pools with dense emergent vegetation.

Backwater areas and off-river ponds are located throughout the length of the river, but occur predominantly at the Sacramento Bar, Arden Bar, Rossmoor Bar, and between Watt Avenue and Howe Avenue. These backwater ponds may be connected to the river by surface water during high flows and by groundwater during other times of the year. The project area provides several backwater areas within existing side-channels and ponds created by former side-channels and mining operations.

CRF typically breed from mid-December through early April (Barry and Fellers 2013). Breeding habitat occurs along margins and shallow parts of sunlit natural and manmade pools. Habitat also includes slow moving streams, overflow basins, and sloughs in Central Valley, as well as channels, canals, farm ponds, and rice fields.

Historically, high winter and spring flows in Central Valley rivers flooded large sections. The high and fluctuating flows and low water temperatures limited breeding habitat in the Central Valley. Extensive natural winter and spring flooding precluded breeding activity, and water declines in the early summer precluded tadpole survival to metamorphosis.

Giant Garter Snake (*Thamnophis gigas)*
Giant garter snakes (GGS) require habitat with adequate water during their active season and emergent herbaceous wetland vegetation (USFWS 2006a). GGS also require higher elevation upland habitat. Rice production areas, irrigated agriculture, and channels and canals provide the majority of GGS habitat in the Central Valley. GGS typically breed in March and April with young born late July through early September (Hansen and Hansen 1990).

Fisheries
Historically, the American River supported fall-run and perhaps late fall-run Chinook Salmon (Williams 2001). Both naturally and hatchery produced Chinook Salmon spawn in the lower American River. Recent analysis by CDFW and USFWS (2010) indicated that approximately 84 percent of the natural fall-run Chinook Salmon spawners in the American River are hatchery-origin fish.

Adult fall-run Chinook Salmon enter the lower American River from about mid-September through January, with peak migration from approximately mid-October through December (Williams 2001). Spawning occurs from about mid-October to early February, with peak spawning from mid-October through December. Chinook Salmon spawning occurs within an 18-mile stretch from Paradise Beach to Nimbus Dam; however, most spawning occurs in the

uppermost 3 miles (CDFW 2012). Chinook Salmon egg and alevin incubation occurs in the lower American River from about mid-October through April. There is variability from year to year; however, most incubation occurs from about mid-October through February. Chinook Salmon fry emergence occurs from January through mid-April, and juvenile rearing extends from January to about mid-July (Williams 2001). Most Chinook Salmon outmigrate from the lower American River as fry between December and July, peaking in February to March (Snider and Titus 2002, PSMFC 2014).

Central Valley Spring-run Chinook Salmon ESU (Oncorhynchus tshawytscha)
Central Valley spring-run Chinook Salmon were listed as threatened on September 16, 1999 (64 FR 50394). This ESU consists of all spring-run Chinook Salmon occurring in the Sacramento River basin. Critical habitat was designated for Central Valley spring-run Chinook Salmon on September 2, 2005 and includes the lower American River from the confluence to Watt Avenue Bridge (70 FR 52488).

The Central Valley spring-run Chinook Salmon ESU is comprised mainly of three self-sustaining wild populations (Mill, Deer and Butte Creeks) (Lindley et al.2007), which are outside of the project area. These three populations have been experiencing positive growth rates since the low abundance levels of the late 1980s. Recent estimates indicate roughly 2,000 miles of salmon spawning and rearing habitat were available before dam construction and mining, but 82 percent of that habitat is unavailable or inaccessible today (Yoshiyama et al.1996). Currently, the bulk of the remaining spring-run Chinook Salmon are produced in Deer, Mill, and Butte creeks, the Feather River, and perhaps the mainstem Sacramento River.

Historically, a spring-run Chinook Salmon spawning population occurred in the American River but this population no longer exists due to their inability to access suitable spawning grounds upstream of Nimbus and Folsom dams. However, small numbers (5-28 per year) of putative spring-run Chinook Salmon[2] juveniles have been captured in a rotary screw trap deployed just downstream of the Watt Avenue Bridge at about RM 9 (1995-1999, 2013, and 2014)(PSMFC 2014, Snider et al.1998, Snider and Titus 2002), which indicates that some nonnatal rearing may occur within the lower American River. Most putative spring-run Chinook Salmon juveniles have been captured from February through April with some captured as early as December and as late as May. Based on observed capture periods and warm temperatures during the summer months, nonnatal rearing is not anticipated to occur prior to November.

California Central Valley steelhead DPS (Oncorhynchus mykiss)
CV steelhead were listed as a threatened DPS under the ESA on January 5, 2006 (71 FR 834) and include all naturally spawned populations of steelhead in the Sacramento and San Joaquin rivers and their tributaries, excluding steelhead from San Francisco and San Pablo bays and their tributaries and two artificial propagation programs: the Coleman National Fish Hatchery and Feather River

Fish Hatchery steelhead hatchery programs. The DPS excludes steelhead spawned and reared at Nimbus Fish Hatchery. Critical habitat was designated for CV steelhead on September 2, 2005 and includes the lower American River from the confluence to Nimbus Dam (70 FR 52488).

Populations of naturally spawned CV steelhead are at lower levels than were found historically and are composed predominantly of hatchery fish (Lindley et al.2007, McEwan 2001). In general, the majority of CV steelhead are confined to non-historical spawning and rearing habitat below impassable dams, but the existing spawning and rearing habitat can sustain steelhead at current population levels. In addition, monitoring data indicates that much of the anadromous form of the species is hatchery supported.

Recent steelhead monitoring data are scarce for the lower American River system. The in-river population is small, with observations of a few hundred adult steelhead returning to spawn in the American River each year. During relatively recent observations (2003-2013), the presence of some spawning steelhead with adipose fins indicates that some in-river spawners are of wild origin (Hannon 2013). However, these wild origin fish are likely progeny of hatchery fish since the "in-river population is likely entirely made up of Nimbus Fish Hatchery steelhead or their descendants" (NMFS 2009, page 612). Based on multi-year seining surveys, juvenile rainbow/steelhead trout rearing during July through September are generally within the 100 to 175 mm size range and appear to utilize habitats with moderate water velocities almost exclusively (John Hannon, pers. comm. , Jan 16, 2015). During river wide surveys in July through September, juvenile rainbow/steelhead trout have been primarily observed in riffle and fast water habitats and none in most other types of habitats of the river. As a result, there is a low likelihood that juvenile steelhead would be present in unrestored project sites prior to, or during construction. In areas where fish have been observed during July through September, density estimates (fish counts per area) indicate an average of 0.00125 juvenile rainbow/steelhead trout per square foot (John Hannon, pers. comm. , Jan 16, 2015).

Critical Habitat

The Endangered Species Act requires that USFWS and NMFS designate critical habitat for species listed as federally endangered or threatened. Several fish species, ESUs, and distinct population segments (DPSs) in the Project Area fall into this category, including:

- Central Valley Spring-run Chinook Salmon ESU
- California Central Valley Steelhead DPS

The USFWS and NMFS have jurisdiction over federally listed threatened and endangered species. An endangered species is defined as "…any species which is in danger of extinction throughout all or a significant portion of its range. " A threatened species is defined as "…any species that is likely to become an

endangered species within the foreseeable future throughout all or a significant portion of its range" (Title 16 USC Section 1532). Section 9 of the ESA makes it illegal to "take" (defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in such conduct") endangered and threatened species (16 USC 1538).

The federal agencies also designate "critical habitat" for listed species. "Critical habitat" is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to a species' conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation (NMFS 2009a).

The lower American River is designated by NMFS to contain critical habitat for the CV steelhead DPS from the confluence to Nimbus Dam, for the spring-run Chinook Salmon ESU from the confluence to Watt Avenue Bridge, and for the Southern DPS of North American Green Sturgeon from the confluence to State Route 160 Bridge. The latter is located outside the project area and would not be affected; therefore, no further analysis is warranted. The ESA defines critical habitat as those specific areas within the geographic area occupied by the species, at the time of listing, containing physical and biological features essential to the conservation of the species that may require special management considerations; and occupied areas that are essential to the conservation of the species.

Primary Constituent Elements of Critical Habitat

Primary constituent elements (PCEs) of anadromous salmonid critical habitat are physical and biological features essential to one or more life stages of each ESU or DPS (spawning, rearing, migration, and foraging). On September 2, 2005, NMFS released the designated critical habitat for seven ESUs of salmon in California (50 CFR 226.211) The specific PCEs included in that designation were: (1) freshwater spawning sites with conditions and substrate that support spawning, incubation, and larval development; (2) freshwater rearing areas with sufficient water quantity and floodplain connectivity to create and maintain suitable habitat conditions supporting juvenile growth and mobility, water quality and food to support growth and development, and natural cover components (e. g. , large wood, shade, large substrate) to escape high flows and predation; (3) unobstructed freshwater migration corridors with sufficient cover and water quantity and quality suitable for juvenile and adult movement and survival; (4) suitable estuarine habitat with natural cover (e. g. , aquatic vegetation, large wood, side channels), food, and sufficient water quantity and quality to support growth, movements, and physiological changes (e. g. , smoltification) of juvenile and adult fish; (5) nearshore marine areas with sufficient cover, food, and water quantity and quality; and (6) offshore marine areas with sufficient food and water quality to support growth and maturation.

In 2014, NMFS and USFWS issued a proposed rule change to 50 CFR 424 in regards to critical habitat and PCEs. However, at this time PCEs of anadromous salmonid critical habitat provide an appropriate basis for determining impacts to critical habitat.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act (Public Law 104 to 297), mandates all federal agencies consult with NMFS on any activities or proposed activities authorized, funded, or conducted by that agency that may adversely impact essential fish habitat (EFH) of commercially managed marine and anadromous fish species (Section 305(b)(2). These regulations require that federal action agencies provide NMFS with a written assessment of the effects of their action on EFH (50 CFR Section 600.920). EFH includes specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growing to maturity. Important components of EFH for spawning, rearing, and migration include suitable substrate composition; water quality (e. g. , dissolved oxygen, nutrients, temperature); water quantity, depth and velocity; channel gradient and stability; food; cover and habitat complexity (e. g. , large woody debris, pools, channel complexity, aquatic vegetation); space; access and passage; and floodplain and habitat connectivity (Pacific Fishery Management Council 2003). EFH also includes all habitats necessary for the production of commercially valuable aquatic species, to support a long-term sustainable fishery, and contribute to a healthy ecosystem (16 USC 1802[10]).

The lower American River is designated by NMFS to contain EFH for Chinook Salmon, as defined by the Magnuson-Stevens Fisheries Conservation and Management Act of 1994, as amended. EFH refers to those waters and substrates necessary for spawning, breeding, feeding, or growth to maturity. Freshwater EFH for salmon consists of four major components: spawning and incubation habitat; juvenile rearing habitat; juvenile migration corridors; and adult migration corridors and adult holding habitat (Pacific Fishery Management Council 2003). Important components of EFH for spawning, rearing, and migration include suitable substrate composition; water quality (e. g. , dissolved oxygen, nutrients, temperature); water quantity, depth and velocity; channel gradient and stability; food; cover and habitat complexity (e. g. , large woody debris, pools, channel complexity, aquatic vegetation); space; access and passage; and floodplain and habitat connectivity (PFMC 2003).

As defined, the term “waters” includes aquatic areas (and their associated physical, chemical, and biological properties) that are used by fish or, where appropriate, have historically been used by fish. The term “substrate” includes sediment, hard-bottom, structures underlying the waters, and associated biological communities. “Necessary” means the habitat required for a sustainable fishery and the managed species’ contribution to a healthy ecosystem. Finally, “spawning, breeding, feeding, or growth to maturity” refers to a species’ full life cycle.

The lower American River provides all four major components of freshwater EFH for salmon. The purpose, and anticipated effect, of the project is to increase the amount of available habitat and enhance stream and riparian habitat suitability for Chinook Salmon.

Fish and Wildlife Coordination Act (FWCA)
The FWCA, as amended in 1964, was enacted to protect fish and wildlife when Federal actions result in the control or modification of a natural stream or body of water. The statute requires Federal agencies to take into consideration the effect that water-related projects would have on fish and wildlife resources. Consultation and coordination with USFWS and State fish and game agencies are required to address ways to prevent loss of and damage to fish and wildlife resources and to further develop and improve these resources.

3.2.2 Environmental Consequences

No Action Alternative
Under the No Action Alternative, Reclamation would not place gravel in the LAR below Nimbus Dam, nor would side-channels be developed. The reach would remain in a deteriorated condition as spawning and rearing habitat for salmonids. Further declines in habitat quality would be likely.

Proposed Action

Rare and Endangered Plants
Sacramento and Slender Orcutt grass habitat generally occurs in vernal pools. Sacramento Orcutt grass Critical Habitat is located near Mississippi Bar at Phoenix Park and near Mather Airport, approximately one mile south of the LAR.

Impacts to existing vegetation would be avoided to the extent practicable. Disturbed riparian areas, not intended for future road access or gravel placement, would be revegetated with native plant species and mulched with certified weed-free hay following the completion of construction activities. The loss of riparian vegetation is an indirect effect of creating and maintaining access points to the river, and covering vegetation with gravel. Riparian vegetation provides overhead cover and a substrate for food production for juvenile salmonids and Green Sturgeon. The loss of riparian vegetation can therefore increase predation rates and reduce feeding rates for juveniles. Most riparian loss would be replanted and effects would be temporary (approximately 1-2 growing seasons to be replaced); only a few areas may not be replanted in order to maintain road access. Loss of riparian vegetation is unlikely at lateral berms due to the placement in cobbled or graveled portions of the channel that contain little soil for the production of riparian vegetation. Riffle supplementation and end-dump talus cone gravel augmentation methods and the construction of instream habitat structure would impact little, if any, of the riparian vegetation surrounding the site. Some vegetation may be temporarily or permanently removed at floodplain and side

channel sites. Overall, the amount of riparian vegetation that would be lost is extremely small.

Migratory Songbirds and Raptors
The Proposed Action would follow the applicable USFWS Nationwide Standard Conservation Measures for avoiding and minimizing impacts to birds (USFWS 2015c). Measures include clearly defined project boundaries, soil erosion and dust control (see Section 3.4 Air Quality), and measures to avoid contamination (see Section 3.3 Hazardous Materials).

Surveys for nesting activity would occur within a 250-foot radius of the construction site and concentrate on mature trees. Surveys for migratory birds would occur within a 50-foot radius of the construction site. A qualified biologist would conduct the surveys at appropriate nesting times two weeks prior to construction. If any active nests are observed, these nests and nest trees would be protected (while occupied) during project activities, using buffer zones, monitoring or delaying activities. The general nesting season for songbirds and raptors in the Project area is approximately March 1 – August 31. To avoid impacts, vegetation removal shall occur outside the nesting season.

Vernal Pools
There is no vernal pool habit within the project area. Vernal pools are generally not present within the active floodplain. The nearest Critical Habitat unit is approximately 1 mile south of the LAR near Mather Airport. The Proposed Action would have no effect on vernal pools.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)
The Proposed Action would not likely adversely affect the valley elderberry longhorn beetle (VELB). Elderberry shrubs, the host plant for the VELB, were found during initial surveys of the Proposed Action area; however site specific designs were altered to avoid elderberry shrubs. USFWS guidelines for VELB require complete avoidance within 100 feet around elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level (USFWS 1998).

Gravel trucks would generate dust which may harm elderberry plants. Dust is listed in the species recovery plan as a threat to the VELB. To avoid affecting the VELB, access roads would be watered each day when being used by gravel trucks and other project-related vehicles. Construction would occur outside of the valley elderberry longhorn beetle's spring emergent period and vehicles would not come in contact with any elderberry shrubs. No elderberry shrubs would be removed or trimmed. Shrubs would be surrounded with orange fencing at a 20-foot radius and flagged prior to construction. In addition, the Proposed Action would have the following additional protective measures:

- Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.

- Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment. " The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.
- Instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

Western Yellow-billed Cuckoo (*Coccyzus americanus*)
Riparian habitat in the project area is fragmented by residential, commercial, and industrial development. The project area lacks dense cover and large contiguous segments of land suitable for breeding habitat. The project area may provide stopover foraging habitat for WYBC. Prior to construction during the months of August and September, surveys would be completed for the presence of nesting birds. If WYBC are found, Reclamation will consult with USFWS on how to proceed. Additional protective measures are included above in discussions on migratory birds. The Proposed Action would not likely adversely affect the Western Yellow-billed Cuckoo.

California Tiger Salamander (*Ambystoma californiense)*
California tiger salamanders are typically found in annual grasslands, grass understory of valley foothill woodland, and uncommonly along streams. Adults breed and lay eggs in vernal pools and other temporary ponds. There are no vernal pools at the project site. The project area is unsuitable habitat due to the fast running water and abundant predators being present. The nearest Critical Habitat unit is approximately 20 miles south of the LAR along Twin Cities Road (California Highway 104). The Proposed Action would have no effect on California Tiger Salamander.

California Red-Legged Frog (*Rana aurora draytonii*)
Red-legged frogs require variety of habitat types including aquatic, riparian and upland areas. Adults often utilize dense, shrubby or emergent vegetation closely associated with deep-water pools with fringes of cattails and dense stands of overhanging vegetation such as willows. The Proposed Action project area includes ponds created by mining operations and former side-channels; however the ponds lack dense emergent vegetation, deep pools, and adjacent upland habitat types.

The Proposed Action would occur outside of the CRF breeding season and the LAR itself does not provide breeding habitat. There is no Critical Habitat listed for CRF in Sacramento County as of March 17, 2010 (75 FR 12816 12959).

In 2005, the USFWS provided guidance on site assessments and field surveys for CRF. Surveys completed in accordance with USFWS guidance are valid for 2 years. As surveys expire or as new sites are selected, qualified biologists would

complete new surveys for CRF as necessary. The Proposed Action would have no effect on the California Red-Legged Frog.

Fisheries

The potential project effects on listed anadromous fishes and their habitat were analyzed in a biological assessment that was provided to NMFS. Construction activities may result in temporary and localized increases in turbidity and suspended sediment, and direct mortality and disturbance of juvenile steelhead may result from instream work. With the incorporation of conservation measures, any negative impacts on populations or habitat would be inconsequential in the long-term. The Proposed Action has been designed to the greatest extent possible to alleviate the potential for take to occur. Additionally, the Proposed Action would result in the addition or enhancement of salmonid spawning and rearing habitat, which is expected to support an increased number of salmonids over the long-term.

Long-term gravel augmentation and restoration of riparian and floodplain ecosystems along the lower American River (including gravel bars, side channels, and shady vegetated banks) were identified as high priority recovery actions in the Central Valley Salmon and Steelhead Recovery Plan (NMFS 2014).

Reclamation provided NMFS with a Biological Assessment (BA) that acknowledges and analyzes the potential effects on listed fish of the Lower American River Anadromous Fish Habitat Restoration Program. Some potential effects of the implementation of the project may result in take of listed salmonids in the project area, although negative effects are expected to be minimal. Most significant immediate and long-term effects of the habitat restoration program would be to improve overall conditions for listed salmonids by increasing and improving habitat. This improvement of habitat would be achieved through increasing spawning and rearing habitat.

The temporary adverse effects that are anticipated to result from the implementation are not the type or magnitude that would be expected to appreciably reduce the likelihood of survival and recovery of the affected species in the project area, or at the ESU/DPS level. VSP parameters of spatial structure, diversity, abundance, and productivity are not expected to be reduced; in contrast, implementing this Project is expected to improve these parameters, which would be necessary for the lower American River populations to reach and/or maintain a viable status. The Central Valley Salmon and Steelhead Recovery Plan (NMFS 2014) indicates that the steelhead population in the American River is classified as Core 2, having the second highest priority for overall recovery efforts. Reclamation expects that any temporary adverse effects of this project would be outweighed by the immediate and long-term benefits to species survival and increased abundance produced by the improvement in habitat for steelhead and Chinook Salmon.

Based on this analysis, Reclamation determined that the proposed Lower American River Anadromous Fish Habitat Restoration Program: (1) *may affect and is likely to adversely affect* CV steelhead, and *may affect, but is not likely to adversely modify* their critical habitat, (2) would have *no effect* on CV spring-run Chinook Salmon, yet *may affect, but is not likely to adversely modify* their critical habitat, and (3) would have *no effect* on Sacramento River winter-run Chinook Salmon. While take of threatened CV steelhead and some habitat modifications may occur during construction activities associated with habitat restoration, these impacts would be short-term and the long-term benefits of the resulting habitat improvements would far outweigh the short-term effects on the listed species.

On July 14, 2015, NMFS issued a biological opinion (BO) on the Proposed Action. The BO was based on a biological assessment provided by Reclamation on March 19, 2015. The BO concluded that the Proposed Action is not likely to jeopardize the continued existence of the federally listed endangered Sacramento River winter-run Chinook Salmon (*Oncorhynchus tshawytscha*) ESU, threatened Central Valley spring-run Chinook Salmon ESU (*O. tshawytscha*) or threatened Central Valley steelhead DPS (*O. mykiss*) and is not likely to destroy or adversely modify their designated critical habitats.

NMFS also provided EFH conservation recommendations for Pacific salmon as required by the Magnuson-Stevens Act. The conservation recommendations are included as the following BMPs:

> (1) Reclamation shall provide a NMFS-approved Worker Environmental Awareness Training Program for construction personnel to be conducted by a NMFS-approved biologist for all construction workers prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to Federally-listed fish, their critical habitat, an overview of the life-history of all the species, information on take prohibitions, protections under the ESA, and an explanation of terms and conditions identified in this Biological Opinion. Written documentation of the training must be submitted to NMFS within 30 days of the completion of training. HAPCs that would benefit from implementation of this training include (1) complex channels and floodplain habitats, (2) thermal refugia and (3) spawning habitat.
>
> (2) Reclamation shall continue to work cooperatively with other State and Federal agencies, private landowners, governments, and local watershed groups to identify opportunities for cooperative analysis and funding to support salmonid and sturgeon habitat restoration projects within the Sacramento River Basin. HAPCs that would benefit from implementation of additional restoration projects include (1) complex channels and floodplain habitats, (2) thermal refugia and (3) spawning habitat.

Effects to habitat areas of particular concern under EFH are similar to ESA-listed critical habitat. Based on this, and the above EFH conservation measures recommended by NMFS, the Proposed Action *is not likely to eliminate or significantly diminish or disrupt*, essential fish habitat (EFH) for species of concern CV fall/late-fall Chinook Salmon ESU.

Fish and Wildlife Coordination Act
Under the FWCA, NMFS also included an additional measure that Reclamation shall post interpretive signs within the Project area describing the presence of listed fish and/or critical habitat as well as highlighting their ecological and cultural value.

3.3 Hazardous Materials

3.3.1 Affected Environment

A hazardous material is defined as "a substance or material… capable of posing an unreasonable risk to health, safety, and property when transported in commerce" (49 CFR 171.8). California Health and Safety Code Section 25501 defines a hazardous material as "any material that… poses a significant present or potential hazard to human health and safety or to the environment if released." Hazardous materials may include fuel, lubricants, and hydraulic fluid. A discussion of water quality and potential hazards to water quality associated with the project is presented in Section 3.1 Water Resources.

3.3.2 Environmental Consequences

No Action Alternative
Under the No Action Alternative, there would be no impacts from hazardous materials since no construction would take place.

Proposed Action
The potential spill of hazardous materials (e. g. , fuel, lubricants, hydraulic fluid) during construction and staging activities into the upper Sacramento River could have deleterious effects on all life stages of winter-run Chinook Salmon, spring-run Chinook Salmon, steelhead, and Green Sturgeon. Additionally, operation of construction equipment in or adjacent to the river presents the risk of a spill of hazardous materials into the river (e. g. construction equipment leaking fluids).

Construction activities that include refueling of construction equipment on location can result in minor fuel and oil spills. Without rapid containment and clean up, these materials could have deleterious effects on all salmonid life stages within close proximity to construction activities. Incubating fry would be at greatest risk due to their limited mobility and their physiological kinetics of toxicant metabolism. Juvenile and adult fish exhibit a greater level of mobility and thus possess a greater ability to avoid potentially hazardous materials. The use of conservation measures for the handling and containment of hazardous materials would minimize the risk of injury or mortality to all life stages of

winter-run Chinook Salmon, spring-run Chinook Salmon, steelhead, and Green Sturgeon.

Reclamation, or a designated contractor, would develop and implement a Spill Prevention Containment and Countermeasures Plan (SPCCP) prior to the onset of construction. The SPCCP would include measures to be implemented onsite that would keep construction and hazardous materials out of waterways and drainages. The SPCCP would include provisions for daily checks for leaks; hand-removal of external oil, grease, and mud; and the use of spill containment booms for refueling. In addition, all construction equipment refueling and maintenance would be restricted to designated staging areas located away from streams and sensitive habitats.

Reclamation expects that adherence to BMPs that dictate the use, containment, and cleanup of contaminants would minimize the risk of introducing such products to the waterway because the prevention and contingency measures would require frequent equipment checks to prevent leaks, would keep stockpiled materials away from the water, and would require that absorbent booms are kept on-site to prevent petroleum products from entering the river in the event of a spill or leak. If BMPs are successfully implemented, Reclamation does not expect fuel spills or toxic compounds to cause injury or death to individual fish.

Instream habitat structures such as boulders and logs generally have the potential to create water hazards. The placement of habitat structure would occur primarily within side channels and outside of the main channel. Safety of boaters, swimmers and other recreational users would be taken into account during project design and construction to avoid placing structure in high hazard areas such as areas where current is directed into logs extending into the channel. Woody material that is washed out and deemed by County Parks personnel to create a safety hazard would be removed at Reclamation's expense.

3.4 Air Quality

Section 176 (c) of the Clean Air Act (CAA) (42 USC 7506 (c)) requires that any entity of the Federal government that engages in, supports, or in any way provided financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the CAA (42 USC 7401 (a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of those standards. Each federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will, in fact conform to the applicable SIP before the action is taken.

3.4.1 Affected Environment

The Proposed Action is located within the Sacramento Metropolitan Air Quality Management District (SMAQMD),which is part of the Sacramento Valley Air Basin (SVAB). Air basins share a common "air shed", the boundaries of which are typically defined by surrounding topography.

Criteria air pollutants are prevalent pollutants in the air that are known to be deleterious to human health. Concentrations are monitored to designate as nonattainment, attainment, and unclassified for criteria air pollutants. Criteria air pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide, sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead.

As specified in the California Clean Air Act of 1988, Chapters 1568-1588, it is the responsibility of each District within the State to attain and maintain California's ambient air quality standards. The SMAQMD is responsible for implementing emissions standards and other requirements of federal and state laws. Management districts issue air quality permits and Best Available Control Technology to be implemented if trigger levels are exceeded.

On November 30, 1993, the EPA promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. The general conformity regulations apply to a proposed Federal action in a non-attainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutant caused by a Proposed Action equal or exceed certain emissions thresholds, thus requiring the Federal agency to make a conformity determination.

Sacramento County is currently designated as a serious nonattainment area for both the national (8-hour) and state (1-hour) ozone standards (ARB 2008). In addition, Sacramento County is designated as a nonattainment area for both national and state particulate matter $(PM)_{10}$ standards, and the state $PM_{2.5}$ standard.

Construction-related emissions are described as "short-term" or temporary in duration and have the potential to represent a significant impact with respect to air quality, especially fugitive PM_{10} dust emissions. Fugitive PM_{10} dust emissions are primarily associated with site preparation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled by construction vehicles on- and off-site.

Ozone precursor emissions of reactive organic gases (ROG) and nitrogen oxides (NOX) are primarily associated with gas and diesel equipment exhaust and the application of architectural coatings.

3.4.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no impacts to air quality since no construction would take place.

Proposed Action

Construction emissions would vary from day to day and by activity, timing and intensity, and wind speed and direction. Generally, air quality impacts from the Proposed Action would be localized in nature.

Short-term air quality impacts would be associated with construction, and would generally arise from dust generation (fugitive dust) and operation of construction equipment. Fugitive dust results from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. Fugitive dust is a source of airborne particulates, including PM_{10} and $PM_{2.5}$.

Large earth-moving equipment, trucks, and other mobile sources powered by diesel or gasoline are also sources of combustion emissions, including nitrogen dioxide, carbon monoxide, volatile organic compounds, sulfur dioxide, and small amounts of air toxics.

For the purposes of the air quality analysis, it was assumed that gravel additions would be completed at up to three sites per year using approximately 12,000 cubic yards (18,000 tons) at each site. Work would be conducted for approximately one month (22 working days) per site for a total of 66 days per year. Using a 24-ton truck it would take approximately 34 one-way trips per day to transport 54,000 tons over 66 days each year. Delivery of gravel to any site would not be done at the same time as delivery to another site. Project-generated construction-related emissions were modeled using CalEEMod 2015 for annual vehicle emissions. Table 4 below lists the equipment used in the CalEEMOD analysis.

Construction-related traffic would occur from daily commutes by construction workers and the delivery of gravel. Gravel additions would be completed at up to three sites per year using approximately 12,000 cubic yards (18,000 tons) at each site. Hauling of gravel outside of the project sites would be limited to Monday through Friday, except holidays, from 7 am to 5 pm for approximately one month per site (22 working days). Delivery of gravel to any site would not be done at the same time as delivery to another site. Using 24-ton trucks to transport the gravel to the staging area, each site would create approximately 34 trips (one-way) per day. Additional traffic would occur from daily worker trips to the site.

Calculated emissions from the Proposed Action were estimated using the 2013 CalEEMOD software (version 2013.2.2), which incorporates emission factors for ROG, NOx, CO, SO_2, and both fugitive and exhaust PM_{10}, and $PM_{2.5}$. Table 5 below provides a summary of the estimated emissions during construction against federal and local emission thresholds in tons per year. Annual estimates were developed assuming 8 hour days for 22 working days per site, up to three sites in each year.

Table 4 - Equipment Assumptions for CalEEMod

Phase Type	Equipment Types	Amount	Hours/Day	HP	Factor
Gravel Augmentation	Off-Highway Trucks	1	8	400	0.38
	Other - 50-ton truck	2	8	600	0.34
	Rubber Tired Dozer	1	8	255	0.4
	Tractors/Loaders/Backhoe	3	8	200	0.37
Gravel Processing	Excavators	1	8	162	0.37
	Other - Gravel sorter	2	8	255	0.4
	Other - Water truck	1	8	260	0.34
	Pumps - Water pumps	2	8	84	0.74
	Rubber Tired Dozer	1	8	255	0.4
	Tractors/Loaders/Backhoe	1	8	200	0.37
Excavation	Excavators	1	8	162	0.38
	Rubber Tired Dozer	1	8	255	0.4
	Tractors/Loaders/Backhoe	3	8	200	0.37
	Off-Highway Trucks	1	8	400	0.38
	Other - 50-ton truck	2	8	600	0.34

Table 5 - Estimated Project Emissions Per Year

Pollutant	Attainment Status[a]	Thresholds for Federal Conformity Determinations[b]	Local Significance Thresholds[a]	Estimated Project Emissions[c]
ROG (as an ozone precursor)	Non-Attainment (ozone)	10 tons/year	N/A	.2244 tons/year
NO_x (as an ozone precursor)	Non-Attainment (ozone)	50 tons/year	85 lbs/day	2.4394 tons/year
PM_{10}	Non-Attainment[d]	100 tons/year	14.6 tons/year	.6658 tons/year
$PM_{2.5}$	Attainment	N/A	15 tons/year	.3688 tons/year
CO	Attainment	N/A	20 ppm 1-hr	1.9363 tons/year
SO_2	Attainment	N/A	.25 ppm 1-hr	.00239 tons/year

[a] SMAQMD
[b] 40 CFR 93.153
[c] Construction emissions estimated with CalEEMod (2015)
[d] California Ambient Air Quality Standards

Mitigation measures to reduce fugitive dust would include watering the roads and exposed areas and limiting vehicle speeds on unpaved roads to 15 miles per hour (mph). When fugitive dust suppression measures are implemented, the estimated emissions for PM_{10} decreases to .3749 tons/year (43.69 percent reduction) and $PM_{2.5}$ decreases to .2269 tons/year (38.47 percent reduction). When BMPs are implemented, the SMAQMD threshold of significance for PM_{10} and $PM_{2.5}$ would be 14.6 and 15 tons per year, respectively (SMAQMD 2015). The threshold for NO_x emissions is 85 lbs/day or approximately 15.5 tons/year.

Ozone can be determined by adding the precursor ROG and NO_x emissions. For the Proposed Action, ozone would be approximately 2.6638 tons/year (ROG [.2244] + NO_x [2.4394]). On October 23, 2014 SMAQMD adopted thresholds of significance for greenhouse gas emissions at 1,110 metric tons of CO_2e per year. The Proposed Action would emit approximately 225 metric tons of carbon dioxide equivalents per year. Because it is believed that global warming is being caused by human activities on the entire planet it would be highly speculative to conclude that this would have a direct adverse impact on global climate. In 2013, U.S. emissions totaled over 6 billion metric tons of CO_2e (U.S. Environmental Protection Agency 2015). Temporary project construction emissions would be minimal and the release of GHGs when compared to the scope of the current anthropogenic release of GHGs would be negligible.

The Proposed Action would result in diesel exhaust emissions from on-site construction equipment. The diesel exhaust emissions would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance.

Odors from equipment emissions may occur and although offensive odors rarely cause any physical harm, they still can be very unpleasant. The occurrence and severity of odor impacts depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptor. The project would not include the long-term operation of any new sources of odor. Thus, the Proposed Action would not create objectionable odors affecting a substantial number of people.

The Proposed Action would involve temporary minor emissions from worker trips made to the site and back. Implementation of the Proposed Action would not result in an increase of long-term emissions from mobile, stationary, or area sources. Total emissions would be temporary, would not exceed the federal general conformity or state de minimis/thresholds, and would not result in a cumulatively considerable net increase.

Best Management Practices

- Basic Air Quality Control Measures would be implemented at the project site, including, but not limited to, watering dirt roads and construction areas and limiting vehicle speeds on unpaved roads to 15 mph.

- Hauling of gravel outside of the project sites would be limited to Monday through Friday, except holidays, from 7:00 am to 5:00 pm.

3.5 Traffic

3.5.1 Affected Environment

Determination of roadway operating conditions is based upon comparison of traffic volumes to roadway capacity. "Levels of service" (LOS) describe roadway operating conditions. LOS is a qualitative measure of the effect of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs. .

3.5.2 Environmental Consequences

No Action Alternative
Under the No Action Alternative, Reclamation would not place gravel in the LAR below Nimbus Dam, nor would side-channels be developed. There would be no impacts to traffic since no construction, including the transportation of gravel, would take place.

Proposed Action
Construction activities would be confined to the project site, off of paved roads. Traffic impacts would generally be related to the transportation of gravel to on-site stockpiles.

Construction-related traffic would occur from daily commutes by construction workers and the delivery of gravel. Gravel additions would be completed at up to three sites per year using approximately 12,000 cubic yards (18,000 tons) at each site. Hauling of gravel outside of the project sites would be limited to Monday through Friday, except holidays, from 7 am to 5 pm for approximately one month per site (22 working days). Delivery of gravel to any site would not be done at the same time as delivery to another site. Using 24-ton trucks to transport the gravel to the staging area, each site would create approximately 34 trips (one-way) per day. Additional traffic would occur from daily worker trips to the site.

Floodplain and side channel habitat enhancements may occur at up to two sites per year. Excess gravel would be redistributed on the riverbank or in the channel within the project area. Traffic impacts related to side channel enhancements would occur from the initial staging of equipment on the project site and from daily commutes by construction workers.

Bicycle and pedestrian trails may be temporarily blocked during gravel delivery and construction activities. Haul trucks and equipment would cross several trails. During construction, these trails would be signed, cautioning users that equipment would be crossing. During times when there is repetitive trucks crossing the trails when gravel is being delivered, a flag person wearing Occupational Safety and Health Administration (OSHA)-approved vests and using the "Stop/Slow" paddle

may be present. Access paths have been designed to avoid heavy recreation areas; however, several sites would require partial closures of recreation areas. Impacts to bicycle and pedestrian trails would be temporary.

Potential impacts to traffic would be temporary and related to the construction activities. Existing land uses would not be altered by the Proposed Action and there would not be permanent changes to Levels of Service.

3.6 Noise

The loudness of sound preserved by the human ear is dependent primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A through E. There is a strong correlation between the way humans perceive sound and A-weighted decibels (dBA). For this reason, the dBA can be used to predict community response to environmental and transportation noise. Sound levels expressed as dB in this section are A-weighted sound levels, unless noted otherwise.

3.6.1 Affected Environment

The existing noise environment within the project area is typical of an open-space area within a suburban environment. The existing noise environment is primarily influenced by vehicular traffic noise on local and regional roadway network. Noise from interspersed industrial and commercial land uses, and outdoor activities (e. g. , people talking, dogs barking, and operation of landscaping and agricultural equipment), contribute to the existing noise environment to a lesser extent. Equivalent sound level (L_{eq}) is an hourly average noise level descriptor.

Noise-sensitive land uses generally include those uses where exposure to noise would result in adverse effects, as well as uses where quiet is an essential element of the intended purpose. In the vicinity of the project site, sensitive land uses include residential and park areas near the gravel augmentation sites and along proposed gravel haul routes. These land uses could potentially experience noise impacts associated with project construction and/or increased traffic from project operation.

In the vicinity of the project site, sensitive land uses include the American River Parkway, portions of the Folsom Lake State Recreation Area (SRA), and single-family and multi-family residential uses with direct line of site to the proposed gravel augmentation sites, and those located along proposed gravel haul routes. These land uses could potentially experience noise impacts associated with project construction and/or increased traffic from project operation.

Table 6 - Construction equipment noise levels

Type of Equipment	L_{max} @ 50 feet (dBA)[1]	Acoustical Usage Factor (%)
Loader	80	40
Dozer	85	40
Excavator	85	40
Off-road Dump Truck	84	40
Pump	77	50
Truck	88	40

[1]Source: Table 9.1 FTA Construction Equipment Noise Emission Levels (USDOT 2006).

3.6.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, Reclamation would not place gravel in the LAR below Nimbus Dam, nor would side-channels be developed. There would be no impacts to noise since no construction, including the transportation of gravel, would take place.

Proposed Action

Construction equipment noise levels listed in Table 5 are the maximum levels at 50 feet. The equivalent hourly average noise level (L_{eq}) would be less than the maximum levels (L_{max}) for each type of equipment. The Proposed Action would incorporate four BMPs for the control of construction noise levels. Implementation of the following BMPs generally results in reduction of construction-generated noise levels by 15 dB to 25 dB. Additionally, sound from outdoor construction activities typically dissipates at a rate of 4.5 dBA to 6.0 dBA for each doubling of distance (FHWA 1980).

The Proposed Action would not involve the use of equipment or processes that would generate potentially high levels of ground vibration. Construction associated with the project would include the use of front-end loaders, bulldozers, excavators and trucks. Construction operations would not generate high levels of ground vibration, such as that from blasting, pile driving, or pavement breaking. Sacramento Mather Airport, a public county airport, is located approximately two miles south of the LAR.

The Proposed Action would incorporate four BMPs for the control of construction noise levels. Implementation of the following BMPs generally results in reduction of construction-generated noise levels by 15 dB to 25 dB.

Best Management Practices

- Construction operations and the hauling of gravel would be limited to Monday through Friday, except holidays, from 7 am to 5 pm.
- Provide and maintain noise control devices for construction equipment. Construction equipment shall be properly maintained per manufacturers'

specifications and fitted with the best available noise suppression devices (i. e., mufflers, silencers, wraps, etc.).
- Coordinate routes and arrange equipment to minimize disturbance to noise-sensitive uses. Construction equipment usage shall be arranged to minimize travel adjacent to occupied residences and turned off during prolonged periods of non-use.
- Designate a disturbance coordinator to respond to all public complaints.

Construction work would not occur between the hours of 8 pm and 6 am or weekends in accordance with Sacramento County Code Section 6.68.090(e). Noise impacts would be temporary and localized and there would be no long-term operational noise sources. Sacramento County General Plan Noise Element criteria of 60 dB L_{dn} at single family residential land uses located adjacent to the proposed material haul routes would not be exceeded.

3.7 Recreation

3.7.1 Affected Environment

The gravel augmentation sites and the Sailor Bar gravel acquisition site are located within the American River Parkway, administered by the Sacramento County Department of Regional Parks. The Mississippi Bar gravel acquisition site is located within the Folsom Lake SRA administered by the California Department of Parks and Recreation, through a contract with Reclamation. A portion of the project area within Folsom Lake SRA is on land owned by the State of California.

Both the American River Parkway and the Folsom State Recreation Area provide a wide range of recreational opportunities including boating, bicycling, hiking, jogging, horseback riding, fishing, bird watching, dog walking, and picnicking. In particular, Sailor Bar is a very popular fishing, boating, hiking, and dog walking area and contains equestrian trails. In addition, the Jedediah Smith Trail is very popular with cyclists, joggers, and hikers.

The area at Mississippi Bar is used mostly for horseback riding, hiking, and dog walking. Shadow Glenn Riding Stable is located at Mississippi Bar, as are a number of walking trails and a paved bicycle path. Nimbus Shoals is presently closed to boating and rafting. However, the Preliminary General Plan/Resource Management Plan for SRA proposes to develop a hand launch access point at this location when Reclamation removes the present fish weir. At gravel augmentation sites 2 and 3, there is little boating activity, since there is no access upstream of the boat ramp at Sailor Bar. There is light boat traffic, primarily canoes, kayaks and drift boats between Sailor Bar and Upper Sunrise.

The major raft put in is at the Sunrise access area with concessions on both sides of the river. Boating usage is much higher during weekends and holidays, than it is during the week. Fishing is particularly popular at Sailor Bar and Nimbus

Shoals, and numbers of fishers increases during late summer into early fall, as returning salmon become more numerous. The river is closed to fishing from November 1 through December 31 from the Hazel Avenue Bridge to Ancil Hoffman Park, when the bulk of the salmon spawn. The area around Sunrise to Nimbus Dam is a popular spot for steelhead fishing during the winter, and the area above Arden Rapid is popular for shad fishing in the spring.

3.7.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, Reclamation would not place gravel in the LAR below Nimbus Dam, nor would side-channels be developed. There would be no impacts to recreation since no construction would take place.

Proposed Action

Construction would be limited to weekdays, except holidays, during normal work hours. During construction, trails would be signed, cautioning users that equipment would be crossing. When there are repetitive trucks hauling gravel across the trails a flag person wearing OSHA-approved vests and using the "Stop/Slow" paddle may be present. Access routes have been designed to avoid heavy recreation areas; however several sites would require partial closures of parks and/or trails.

Trails and portions of parks that would need to be closed would be limited to when work is actually occurring. For several sites, this would be limited to trucks hauling gravel across trails.

In-river work would occur during flows of less than 3,000 cfs. The river is wide enough for boats to go around construction vehicles. Signs would be posted upstream of construction areas to warn boaters where in-river work would take place. Designs for gravel augmentation would ensure a continuous navigable channel at least one foot deep and the 30 feet wide. Habitat structure would be placed at the stream margins. Navigation would not be impacted.

Instream habitat structures such as boulders and logs generally have the potential to create water hazards. The placement of habitat structure would occur within developed side channels and sloughs outside of the main channel. Since the channels would be designed to be about one to three feet deep, they would not create boating hazards.

The Proposed Action would not increase the use of existing facilities, nor substantially contribute to the physical deterioration of facilities. The construction or expansion of new facilities would not be involved in the Proposed Action.

Recreation opportunities in the study area are abundant. The impacts to the parks, trails, boating, and fishing areas along the river would be less than significant when compared to the total recreation opportunities for the surrounding population. Impacts to recreation from construction activities would be temporary and localized. Activities that may impact public recreation areas would be coordinated with the responsible agencies.

3.8 Cultural Resources

Cultural resource is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The National Historic Preservation Act (NHPA) of 1966 (Title 54 U. S. C.300101 et. seq.) is the primary Federal legislation that outlines the federal government's responsibility related to cultural resources. Title 54 U. S. C. § 306108, formerly and commonly known as Section 106 of the NHPA, requires Federal agencies to consider the effects of their actions on historic properties and to provide the Advisory Council on Historic Preservation an opportunity to comment. The 36 CFR Part 800 regulations that implement Section 106 of the NHPA describe how Federal agencies address these effects. The regulations follows a series of steps that are designed to identify interested parties; determine the area of potential effects (APE); identify historic properties (defined as cultural resources that are eligible for inclusion in or listed in the National Register of Historic Places [National Register]); to assess the effects of the action on historic properties; and to resolve adverse effects, if any, on historic properties. The Section 106 process must be conducted in consultation with the State Historic Preservation Officer (SHPO), Indian tribes, and other interested parties, as applicable.

3.8.1 Affected Environment

In 2009, surveys were conducted under CVPIA (b)(13) for portions of the lower American River in the vicinity of Mississippi Bar and Sailor Bar. At the time, gravel acquisition was proposed at both of these locations. In 2015, additional efforts to identify historic properties included a record search at the North Central Information Center, an internal Reclamation archival search, and a pedestrian survey of the Proposed Action sections. Through the record search efforts, a large historic mining site, P-34-335, also known as the Capital Dredge Company Diggings and Smithsonian Trinomial CA-SAC-308H, was identified.
Capital Dredge Company operated along the American River during the 1930s and the archaeological site was first recorded in 1992 as a collection of mining related features. Since that date the site documentation has been added to and today the site encapsulates thousands of acres in Sacramento County. Physical evidence for P-34-335 is absent from the currently Proposed Action area at Sacramento Bar.

Both the Sailor Bar dredge tailings and Mississippi Bar Dredge Tailings have been determined eligible for inclusion in the National Register as contributing to P-34-335. Two elements of Sailor Bar possess a high degree of integrity and interpretive value and Mississippi Bar includes four elements of high interpretive value. Reclamation did not previously, and does not currently plan to remove any gravel from the four elements of Mississippi Bar that possess high interpretive value. However, gravel from Sailor Bar was required. Pursuant to 36 CFR Part 800.5(a), the acquisition of gravel from the two sensitive locations at the Sailor Bar dredge tailings would constitute an adverse effect to historic properties.

To resolve adverse effects, pursuant to 36 CFR Part 800.6(c), a Memorandum of Agreement was executed by Reclamation and SHPO in 2010: Memorandum of Agreement Between the Bureau of Reclamation and the California State Historic Preservation Officer Regarding the Resolution of Adverse Effects to Historic Properties from the Acquisition of Gravel from Sailor Bar on the American River, Sacramento County, California. The mitigation stipulations were met and concurred with by SHPO in 2012.

The current planned locations are situated within the American River channel which exists as an extremely modified landscape. Historic dredge mining and gravel acquisition resulted in a severe reworking of the natural channel and surrounding vicinity. In addition historic hydraulic mining in the foothills resulted in the deposition of countless tons of sand and silt during flood events. Construction of Nimbus Dam stopped the historic flooding, and as a result, the numerous resultant silt and sand bars have developed soils which support current lacustrine vegetation. In regards to cultural resources, the aforementioned processes create an environment which shows a negligible sensitivity for the presence of historic properties. Further, due to the fragile and ephemeral nature of prehistoric resources, the negligible sensitivity is exacerbated.

3.8.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, existing conditions would persist and the Proposed Action would not be implemented. As a result, the No Action alternative would result in no impacts to cultural resources from the Proposed Action.

Proposed Action

The Proposed Action involves the restoration of anadromous salmonid habitat within various portions of the American River.

Reclamation initiated consultation with the State Historic Preservation Officer (SHPO) on September 4, 2015, with a determination of No Historic Properties Affected for the Sacramento Bar site of the Proposed Action. SHPO concurred with the determination in a letter dated September 21, 2015. As specific program activities are identified, Reclamation would comply with Section 106 of the NHPA as required, prior to implementation of the project. As such, should the Proposed Action be implemented, the resulting activity would have no impact on historic properties. Reclamation will consult with the SHPO at all sites.

In the event of an unanticipated archaeological discovery, the operations would immediately cease in the vicinity of the discovery and Reclamation's cultural resource staff would be contacted immediately. Reclamation's cultural resource staff would assess the discovery, conduct any required notifications and consultations, and provide direction on how to proceed. The procedures at 36 CFR § 800.13 would be followed.

In the event that human remains are uncovered during this undertaking, the nearby project activities would cease immediately and Reclamation cultural resource staff would be contacted. Reclamation's cultural resource staff would provide direction on how to proceed. If human remains are discovered on lands under the jurisdiction of Reclamation, they would be treated in accordance to the provisions of the Native American Graves Protection and Repatriation Act of 1990 (25 U. S. C 3001). If human remains are discovered on lands owned by any other non-federal entity, they would be treated in accordance to the provisions in the California Health and Safety Code (HSC 7050.5). If the remains are determined to be of Native American origin, procedures would be guided by California Public Resources Code Section 5097 through California's Native American Heritage Commission.

3.9 Environmental Commitments

Environmental commitments are measures or practices adopted to reduce or avoid adverse effects that could result from project operations. These are also known as protective measures and are in accordance with relevant permits. The following section describes the best management practices, environmental commitments, and mitigation measures that would be implemented:

Protection Measure #1 – Air Quality

- Reasonably available control measures would be implemented at the project site, including, but not limited to, watering dirt roads and construction areas.
- Hauling of gravel outside of the project sites would be limited to Monday through Friday, except holidays, from 7 am to 5 pm.

Protection Measure #2 – Valley Elderberry Longhorn Beetle

- Place orange construction fencing in a 20-foot radius around shrubs within 100 feet of the Proposed Action.
- Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.
- Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.
- Instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

Protection Measure #3 – Fisheries

- Instream work would be timed to avoid the most sensitive lifestages of steelhead and salmon (egg incubation)

- Added gravel would be uncrushed, rounded "natural river rock" with no sharp edges, and the distribution of particle size would be based on recommendations of the Anadromous Fish Restoration Program.
- Equipment working in the river would be moving slow enough for fish to avoid disturbed areas.
- Processed gravel would be screened and/or washed and placed into the river at a rate to meet water quality criteria in the 401 certification, Gravel would be completely free of oils.

Protection Measure #5 – Western Yellow-billed Cuckoo

- Prior to construction during the months of August and September, surveys would be completed for the presence of nesting birds. If WYBC are found, Reclamation would consult with USFWS on how to proceed.

Protection Measure #5 – California Red-legged Frog

- Qualified biologists would complete surveys for CRF at sites with deep-water pools with dense emergent vegetation.
- Surveys shall be completed at night between January and July for adults and during the day between July and September for sub-adults.
- Surveys would be updated every two years and as new sites are selected that contain CRF frog habitat. If CRF are found, Reclamation would consult with USFWS on how to proceed.

Protection Measure #6 – Cultural Resources

- In the unlikely event that human remains are uncovered, the project would cease immediately and Reclamation cultural resource staff would provide direction on how to proceed.
- If human remains are discovered on lands under the jurisdiction of Reclamation, they would be treated in accordance to the provisions of the Native American Graves Protection and Repatriation Act of 1990 (25 U. S. C 3001).
- If human remains are discovered on lands owned by any other non-federal entity, they would be treated in accordance to the provisions in the California Health and Safety Code (HSC 7050.5).

Protection Measure #7 – Geology and Soils

- All disturbed soils within the project site would be stabilized to reduce erosion potential both during and following construction.
- Planting, seeding with native species, and mulching would be used. Where suitable vegetation cannot reasonably be expected to become established non-erodible material would be used for such stabilization.

Protection Measure #8 – Hazardous Materials

- Comply with local, state and Federal regulations on the use of hazardous materials.

- Workers will check daily for leaks; conduct hand-removal of external oil and grease.
- All construction equipment refueling and regular maintenance would be restricted to designated staging areas located away from streams and sensitive habitats.

Protection Measure #9 - Water Quality

- Monitor turbidity during instream work. Construction shall be curtailed if turbidity exceeds permit criteria.
- Inspect all equipment working within the stream channel daily for fuel, lubrication, and coolant leaks; and for leak potentials (e. g. cracked hoses, loose filling caps, stripped drain plugs); equipment must be free of fuel, lubrication, and coolant leaks.
- Wash vehicles or equipment only at approved off-site areas.
- Clean all equipment prior to working within the stream channel.
- Fuel and lubricate equipment in designated staging areas located outside the stream channel and banks.
- Keep spill prevention and response kits near construction areas and train workers in their use. Train work crews on the use of kits and proper spill response procedures.
- Process gravel as needed prior to being placed in the river.

Protection Measure #10 – Noise

- Construction operations are prohibited between the hours of 8 pm and 6 am.
- Provide and maintain noise control devices for construction equipment.
- Coordinate routes and arrange equipment to minimize disturbance to noise-sensitive uses.
- Designate a disturbance coordinator to respond to all public complaints.

Protection Measure #11 – Recreation and Traffic

- Construction would be limited to weekdays, except holidays, during normal work hours.
- Trails shall be signed, cautioning users of the equipment. During times when there is repetitive trucks crossing heavily used the trails when gravel is being delivered, a flag person wearing OSHA-approved vests and using the “Stop/Slow” paddle may be present
- Designs for gravel augmentation would ensure a continuous navigable river channel at least one foot deep and the 30 feet wide at a river flow of 1000 cfs.

3.10 Cumulative Effects

According to the CEQ regulations for implementing the procedural provisions of NEPA, a cumulative impact is defined 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 effects can result from individually minor but collectively significant actions taking place over a period of time.

Considering the relatively short time that in stream work would be underway, and meeting the standards, there would not be any significant cumulative water quality effects. There would be positive cumulative effects on salmon and steelhead from the Proposed Action and other projects. Project-generated construction-related mitigated criteria air pollutant and precursor emissions would not exceed thresholds. Thus, project-generated emissions would not result in a cumulatively considerable net increase of a criteria pollutant. Project generated noise level would be short-term in nature and would not contain any long-term operations. The construction sites would likely be temporarily off limits to recreationists, and they would have to pursue their activities elsewhere. There are no adverse impacts associated with implementing the Proposed Action, and therefore there are no cumulative effects to consider.

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the project area considered in this EA. Future Federal actions that are unrelated to the Proposed Action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Non-Federal actions that may affect the project area include angling and State angling regulation changes, voluntary State or private sponsored habitat restoration activities, agricultural practices, water withdrawals and diversions, adjacent mining activities, and increased population growth resulting in urbanization and development of floodplain habitats. While state angling regulations have moved towards restrictions on selected sport fishing to protect listed fish species, incidental hooking of Chinook Salmon, hook and release mortality of steelhead, and trampling of redds by wading anglers may continue to cause a threat. Habitat restoration projects may have short-term negative effects associated with in-water construction work, but these effects typically are temporary, localized, and the outcome is expected to benefit listed species and habitats. Increased water turbidity levels for prolonged periods of time may result from agricultural practices, adjacent mining activities, and increased urbanization and/or development of riparian habitat, and could adversely affect the ability of young salmonids to feed effectively, resulting in reduced growth and survival. Turbidity may cause harm, injury, or mortality to juvenile Chinook Salmon or steelhead in the vicinity and downstream of the project area. High turbidity concentration can cause fish mortality, reduce fish feeding efficiency and decrease food availability (Berg and Northcote 1985, McLeay *et al.1*984, NMFS 1996a). Farming and ranching activities within or adjacent to the project area may have negative effects on water quality due to runoff laden with agricultural chemicals. Water withdrawals and diversions may result in entrainment of individuals into unscreened or improperly screened diversions,

and may result in depleted river flows that are necessary for migration, spawning, rearing, flushing of sediment from spawning gravels, gravel recruitment, and transport of LWM. Future urban development may adversely affect water quality, riparian function, and stream productivity.

These actions would occur without respect to whether the Sacramento River Anadromous Salmonid Habitat Restoration Program is implemented, and there are statutes in place to control all these activities to minimize their detrimental impacts. No reasonably foreseeable future projects within the current project area are known at this time. Implementation of the Proposed Action is not expected to result in significant cumulative effects, in combination with other projects, within or outside of the project area.

Lower American River Salmonid Spawning Gravel Augmentation and Side-Channel Habitat Establishment Program (2008-2014)

In 2008, the Reclamation prepared an EA for the LAR Salmonid Spawning Gravel Augmentation and Side-Channel Habitat Establishment Program as described above (see Section 1.1 Background).

Nimbus Hatchery Fish Ladder Project (2013)

In 2013, Reclamation signed a Record of Decision on the Nimbus Hatchery Fish Passage Project Environmental Impact Statement/Environmental Impact Report. The project is anticipated to begin in 2018 or later, when funding may be available to construct a new ladder. Following the fish ladder construction and the initial years of fish ladder effectiveness testing, the weir foundation may be removed. The removal would likely occur sometime after 2020.

Section 4 Consultation and Coordination

Several Federal laws, permits, licenses and policy requirements have directed or guided the National Environmental Policy Act analysis and decision making process of this EA.

4.1 Public Review Period

The EA was made available for public comment. Reclamation issued a press release on January 20, 2016, providing a link to the EA and instructions on how to comment. No comments were received.

4.2 State Historic Preservation Officer

Reclamation will consult with the SHPO regarding a finding of no effects to historic properties pursuant to 36 CFR Part 800.4(d)(1).

4.3 Endangered Species Act (16 USC § 1531 et seq.)

Section 7 of the Endangered Species Act requires Federal agencies to ensure that discretionary federal actions do not jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of the critical habitat of these species.

Reclamation prepared a Biological Assessment (BA) for endangered winter-run Chinook Salmon (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU), threatened Central Valley spring-run Chinook Salmon, and threatened California CV steelhead (*O. mykiss*) distinct population segment (DPS). NMFS provided Reclamation a BO on July 14, 2015. NMFS determined in that the Proposed Action *may affect and is likely to adversely affect* Central Valley steelhead, and *may affect, but is not likely to adversely affect* Sacramento River winter-run Chinook Salmon and Central Valley spring-run Chinook Salmon. NMFS also concluded that the Proposed Action is *not likely to destroy or adversely modify* their critical habitats. It was determined that the Proposed Action would adversely affect the EFH of Pacific salmon in the project area. Reclamation has adopted the EFH conservation recommendations, which are included in the BO as NMFS's reasonable and prudent measures and associated terms and conditions.

Reclamation has determined the Proposed Action *may affect, but is not likely to adversely affect* the federally listed threatened Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)(VELB) and Western Yellow-billed Cuckoo (*Coccyzus americanus*)(WYBC) and would *not adversely modify* any designated or proposed Critical Habitat for terrestrial species. Reclamation will consult with the USFWS under Section 7 of the ESA.

4.4 Section 404 of the Clean Water Act

Reclamation will obtain an individual permit from the U. S. Army Corps of Engineers (Corps) for jurisdictional water of the United States (American River) wetland and other waters. A Waters of the United States Determination was completed for the American River.

4.5 Section 401 of the Clean Water Act

Prior to conducting work under a Section 404 Permit, Reclamation must obtain a Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB). This declaration states that any discharge complies with all applicable effluent limitations and water quality standards. Reclamation will submit an application to the RWQCB.

4.6 Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act applies to the American River from the mouth of the river to Bradshaw Rd, including portions of the Proposed Action area. Reclamation will consult with the Corps on Section 10 during the Section 404 process.

State and Local Laws, Regulations, and Policies

4.7 Sacramento County Department of Regional Parks

Much of the Proposed Action is located within the American River Parkway. Reclamation will coordinate with Sacramento County Department of Regional Parks for activities within the parkway.

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