LOWER YUBA RIVER LARGE WOODY MATERIAL MANAGEMENT PLAN PILOT STUDY

YUBA COUNTY, CALIFORNIA

FINAL ENVIRONMENTAL ASSESSMENT

August 2012

US Army Corps of Engineers ®
Sacramento District

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DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
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SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

AUG 22 2012

FINDING OF NO SIGNIFICANT IMPACT
Lower Yuba River Large Woody Material Management Plan Pilot Study
Yuba County, California

The U.S. Army Corps of Engineers (Corps), Sacramento District, has determined that implementing the proposed Lower Yuba River Large Woody Material Management Plan (LWMMP) Pilot Study would have no significant effects on the quality of the human environment. The project area is located along the lower Yuba River in Yuba County, California, approximately 20 miles east from the City of Marysville. Several potential placement sites of large woody material (LWM) have been located along an approximately four-mile reach of the lower Yuba River downstream of the Highways 20 Bridge. In addition, the Pilot Program may consider launching LWM from the base of Englebright Dam.

The proposed action is in response to a National Marine Fisheries Service (NMFS) long-term biological opinion (BO) dated February 29, 2012, which directs the Corps to "develop and implement a long term program to replenish instream woody material." The intent of the LWMMP and Pilot Study is to enhance rearing conditions for spring-run Chinook and Central Valley steelhead by replenishing the supply of LWM into the lower Yuba River.

Authorized by the Rivers and Harbors Act of August 30, 1935 (P. L. 409, 74th Congress, 1st Session, 49 Stat. p. 1028-1049), Englebright Dam was constructed by the California Debris Commission in 1941 primarily to trap sediment originating in upstream areas. The Rivers and Harbors Act of 1935 also authorized the development of power at Englebright Dam. Upon decommissioning of the California Debris Commission, authorized by Section 1106 of the 1986 Water Resources Development Act (P. L. 99-662, 99th Congress, 2nd Session, November 7, 1986), administration of Englebright Dam was assumed by the Corps. Construction of recreation facilities at Englebright Lake and provision of services to the public by concessionaire is in accordance with Section 4 of the Flood Control Act of 1944 (58 Stat. 887) and subsequent amendments.

A Final Environmental Assessment (EA) was prepared to evaluate the potential effects to natural and cultural resources in the proposed project area. Based on the evaluation of potential effects described in the EA, I have determined that the proposed study would have no significant adverse effects on existing resources including hydrology and water quality, biological resources (including special status species, vegetation and wildlife), and cultural resources. No additional environmental documentation is required, and the project activities may proceed as proposed.

22 Aug 2012
Date

William J. Leady, P.E.
Colonel, U.S. Army
District Engineer

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ACRONYMS

APE	Area of Potential Effect
BLM	Bureau of Land Management
BMP	Best Management Practices
BO	Biological Opinion
CDFG	California Department of Fish and Game
CDOT	California Department of Transportation
CDWR	California Department of Water Resources
CESA	California Endangered Species Act
cfs	cubic feet per second
cm	centimeter
Corps	U.S. Army Corps of Engineers
CRWQCB	California Regional Water Quality Control Board
EA	Environmental Assessment
EDR	Englebright Dam Reach
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FONSI	Finding of No Significant Impact
HTRW	hazardous, toxic, or radiological waste
LWM	Large Woody Material
LWMMP	Large Woody Material Management Plan
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
PG&E	Pacific Gas and Electric
SHPO	State Historic Preservation Officer
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
VELB	Valley elderberry longhorn beetle
YCWA	Yuba County Water Agency

1.0 Purpose and Need for Action

1.1 Background

On November 21, 2007, National Marine Fisheries Service (NMFS) issued a long-term biological opinion (BO) regarding the U.S. Army Corps of Engineers' (Corps) operation and maintenance of Daguerre Point and Englebright dams (NMFS, 2007). On December 20, 2011, the U.S. District Court ordered NMFS to file a new BO by February 29, 2012. The new BO, dated February 29, 2012, included an incidental take statement with several terms and conditions. Term and Condition D3 of the BO requires the Corps to "develop and implement a long term program to replenish instream woody material" (NMFS, 2012). In anticipation of Term and Condition D3, the Corps has prepared the *Lower Yuba River Large Woody Material Management Plan* (LWMMP), which includes the implementation of a Pilot Study starting in 2012 in order to enhance rearing conditions for spring-run Chinook and Central Valley steelhead (Corps, 2012).

1.2 Proposed Action

In accordance with BO Incidental Take Statement Term and Condition D3a, the Corps proposed to initiate a pilot study to determine an effective method of replenishing the supply of large woody material (LWM) back into the lower Yuba River. As described in the LWMMP, the Pilot Study will use LWM from existing stockpiles at New Bullards Bar Reservoir for placement at selected sites along the lower Yuba River. The Pilot Study would include monitoring of placed materials. The Pilot Study will be evaluated to assess the effectiveness of LWM placement in the lower Yuba River in order to develop a long term program (Corps, 2012). If significant changes to the LWMMP are proposed as a result of lessons learned from the pilot study for the broader management plan, appropriate supplemental environmental documentation will be produced.

1.3 Location

The Preferred Alternative site is located along the lower Yuba River in Yuba County, California (Plate 1), approximately 20 miles east from the City of Marysville (Plate 2). Several potential placement sites have been identified along an approximately four-mile reach of the lower Yuba River downstream of the Highway 20 Bridge (Plate 3). In addition, the Pilot Study may consider introducing LWM from the base of Englebright Dam. Placement sites and means will be finalized based on further site assessments, the nature of existing woody material stockpiles, and consultation with resource agencies. LWM will be procured from existing stockpiles at New Bullards Dam and Reservoir, which is located approximately 15 miles northeast of the Highway 20 Bridge.

1.4 Purpose and Need for the Action

Instream LWM provides escape cover and relief from high current velocities for juvenile salmonids and other fishes. Although there is not a current consensus on the amount of large wood pieces found along the reach of the lower Yuba River extending south of Highway 20 bridge to Hammon Bar, the proposed Pilot Study will place and monitor quantities of LWM, as required by the 2012 BO, to improve juvenile salmonid rearing habit in the lower Yuba River.

1.5 Purpose and Scope of the Environmental Assessment

The purpose of this Environmental Assessment (EA) is to determine whether the proposed action would result in significant adverse effects on the environment, thus requiring the preparation of an Environmental Impact Statement (EIS), or whether the types and overall significance of effects of the proposed action would support a Finding of No Significant Impact (FONSI).

This EA presents the proposed action and no action alternatives, describes the environmental resources in the project area, determines the potential effects of the preferred alternative on those resources, and, if appropriate, proposes mitigation measures to reduce the overall adverse environmental effect of the proposed action. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) to provide full disclosure of potential environmental effects.

This EA will also be used to fulfill the requirements of the California Environmental Quality Act (CEQA) for discretionary actions, if any, by state or local agencies. Pursuant to Section 15221 of the CEQA Guidelines, state and local agencies should use NEPA documentation if it is prepared before CEQA documentation would otherwise be prepared.

1.6 Decision Needed

The District Engineer, the Commander of the Sacramento District of the Corps, must decide whether or not to proceed with the proposed action described in this EA and whether a FONSI or EIS is most appropriate. This EA provides the basis for the decision.

1.7 Project Authority

Harry L. Englebright Dam and Lake were authorized by the River and Harbor Act of 1935 (49 Stat. 1028) as a unit of the Sacramento River Debris Control Project. Construction of recreation facilities at Englebright Lake and provision of services to the public by concessionaire is in accordance with Section 4 of the Flood Control Act of 1944 (58 Stat. 887) and subsequent amendments.

2.0 Alternatives

This section presents the preferred alternative to meet the purpose and need described above. A No Action alternative is considered to illustrate the potential effects of not implementing the preferred alternative.

2.1 No Action

The No Action alternative serves as the environmental baseline against which the proposed action and its effects can be compared. Under this alternative, the Corps would not implement the Pilot Study or the broader LWMMP. If no action is taken, the natural supply of woody material along the lower Yuba River would not be augmented by placement of additional LWM. As a result, there would not be any potential for a corresponding improvement of juvenile salmonid rearing habitat in the lower Yuba River.

2.2 Large Woody Material Pilot Study (Preferred Alternative)

2.2.1 Large Woody Material

In accordance with the BO, a minimum of 500 pieces of 30-60 centimeter (cm) in diameter and a minimum of 730 cm long, and 30 pieces 60-90 cm in diameter and at least 730 cm long, and 10 pieces greater than 90 cm in diameter and 730 cm long shall be placed in 2012 and in 2013. Of this annual number, 10 percent of the pieces shall have attached rootwads, and not more than 20 percent of the pieces can be orchard tree species.

2.2.2 Large Woody Material Procurement and Placement

LWM for the proposed Pilot Study will be procured from existing stockpiles at New Bullards Dam and Reservoir. A cable-and-buoy line (floating boom) spans the reservoir just upstream of the dam. The floating boom captures woody material that has entered and traveled downstream on the reservoir's surface. Yuba County Water Agency (YCWA) manages the LWM that is washed into the New Bullards Bar Reservoir from the upstream watershed. Tug boats are used to push LWM into shallow coves that have landside access and the pieces are subsequently stockpiled on the shoreline using a boom. The Corps will coordinate with YCWA to gather LWM from these stockpiles for transport and placement in the Pilot Study area. If the amount and size of LWM from the New Bullards stockpiles are insufficient to meet the meet the needs of the Pilot Study, then orchard trees from existing stockpiles may be used to the extent allowed by the BO.

Placement sites and means for the Pilot Study will be finalized based on further site assessments, the nature of existing stockpiles, and consultation with resource agencies. The placement sites identified in the LWMMP are approximate locations. The exact placement and configuration of LWM will depend on site conditions (including access) and source materials. The LWMMP calls for LWM to be placed in the functional floodplain, or deposited directly within the low flow channel, as access allows.

For the Pilot Study, sites within the study area must be legally and physically accessible by required equipment. Placement of LWM will occur when the river stage is low to ensure placement within the boundaries of the functional floodplain but not directly in the low stage water. Placement will not require the removal of existing vegetation or in-water excavation. It is anticipated that placement of LWM within the functional floodplain will result in the natural transport and distribution of some of the material to lower reaches of the river during higher stage flows. An annual monitoring program integrated with the existing gravel monitoring program will assess the effectiveness of LWM placement and guide subsequent placements under the Pilot Study and the development of the long term LWMMP.

2.2.3 Staging, Stockpiling, Transport, and Demobilization

All equipment will be staged in previously disturbed areas outside of the functional floodplain. Woody material will be procured from existing YCWA stockpiles at New Bullards Dam and Reservoir. Materials will be transported to downstream placement sites via logging or dump trucks. Trucks will utilize existing roads and access sites.

2.2.4 Work Schedule

The proposed work would be conducted annually over two to six weeks in the late summer or Fall, once sufficient stockpiles have been collected. Work hours would be limited to weekdays, from 8:00 a.m. to 5:00 p.m.

3.0 Affected Environment and Environmental Consequences

3.1 Environmental Resources Not Considered in Detail

Initial evaluation of the potential effects of the alternatives indicated that there would not be any significant adverse direct, indirect, or cumulative effects on many resources due to the scale, scope, and schedule of the proposed action. These resources are discussed in Sections 3.1.1 through 3.1.11.

3.1.1 Climate

The project area has a Mediterranean, semi-arid climate characterized by cool, moist winters and warm, dry summers. Summer temperatures average approximately 90 degrees Fahrenheit (°F) during the day and 50 °F at night. Winter daytime temperatures average in the low 50's, and nighttime temperatures average in the upper 30s. Precipitation data have been recorded daily at Englebright for the National Weather Service since 1955 (WRCC 2005). Annual precipitation averaged over this 50-year time span is about 34.5 inches, with approximately a 40 percent chance of precipitation occurring on any given day between November 15 and March 1. Heaviest monthly rainfall periods of record include December 1955 at 17.65 inches, March 1995 at 16.60 inches, and January 1969 at 16.11 inches (WRCC 2005). The Preferred Alternative would not result in any changes to climate.

3.1.2 Soils, Geology and Seismicity

The surface of the Central Valley is composed of unconsolidated Pleistocene (two to three million years ago) and Recent (10,000 year ago) sediments. The valley floor is composed of alluvial fan and channel deposits from the various rivers in the area (Corps 1998).

Yuba County lies in east-central California, an area experiencing relatively low seismic activity. The nearest active fault is the Cleveland Hill Fault, located about 20 miles northeast of Marysville. This fault was the source of the 5.7 magnitude earthquake in the Oroville area in 1975. The Foothills Fault system in Yuba County is a continuation of the Cleveland Hill Fault. Seismic activity in the area is estimated to have a very long recurrence interval so special seismic zoning for the Foothills Fault system is not necessary (Corps 1998).

The current and historic lower Yuba River channel contains water-worn pebbles, cobbles, and boulders. For about four miles upstream of Daguerre Point Dam, the south bank is composed of dredge spoils from the Yuba Goldfields, and the north bank is predominantly composed of the Riverbank Formation, which is a highly resistant darn complex of red sand, silt, gravel, and small cobble from the Pleistocene. Because of the limited scope and size of the placement of LWM throughout the lower Yuba River, the Preferred Alternative would not result in any changes to the geology or the seismicity of the area.

3.1.3 Land Use

The Yuba County General Plan identifies the types of land use in the vicinity of the project area as public land, foothill agriculture, extractive industrial, and open space (QUAD Consultants 1994). The Corps holds fee title to approximately 165 acres of land surrounding the dam at Englebright. Further downstream from Englebright, land ownership in the vicinity of the lower Yuba River includes Pacific Gas and Electric Company (PG&E) and University of California, respectively, followed by private parcels and several gravel mining operations. The largest gravel extractive operation occurs in the Yuba Goldfields, located south of the Yuba River and downstream of the Highway 20 Bridge (Corps 2001). The BLM had proposed a land exchange in the Yuba Goldfields to provide about six-miles of public access along the Yuba River from the Highway 20 Bridge downstream to Daguerre Point Dam (Corps 2001).

The limited quantities of woody material currently flowing down the lower Yuba River have no significant impact on land use relating to public lands, agriculture, industrial uses, or open spaces. Because of the limited scope and size of the placement of LWM throughout the lower Yuba River, the Preferred Alternative would not result in any changes to land use.

3.1.4 Agriculture and Prime and Unique Farmland

The Preferred Alternative is not located in the vicinity of any land designated as prime or unique farmland. No agricultural lands would be taken out of production due to the Preferred Alternative.

3.1.5 Environmental Justice

The proposed action is a minor undertaking that would not affect the socioeconomic conditions in the area. There would not be disproportionately high or adverse effects on the health or environment of minority and low-income populations.

3.1.6 Aesthetics

The visual character of the lower Yuba River is varied. Rolling hills above the river are covered with green grass and wildflowers in the spring, fading to a golden brown in the summer and fall. Annual grasslands dominate areas where land is not being farmed. Interspaced riparian, vernal pool, and wetland habitat is located along river corridors and in annual grassland depressions

Views along the lower Yuba River have been extensively altered due to gold and gravel mining with gravel mining still taking place on both sides of the river. Because the river in this area has undergone extensive human modification, riparian vegetation has only re-established itself in a few small areas. There are large areas with little or no vegetation (Bureau of Land Management, 2011).

There is currently a lack of consensus on the amount of instream woody material occurs in the lower Yuba River. Reportedly dams upstream of Englebright block some downstream transport of woody material and there is a lack of riparian vegetation throughout most of the river. The proposed plan calls for placing woody material into the lower Yuba River's functional floodplain to restore natural conditions prior to the construction of the upstream dams. It will be visible to casual observers in the short-term, until materials is naturally broken down or transported downstream. The proposed action would temporarily add natural woody materials along the lower Yuba River. Given the scale of the river channel and current lack of woody material, the proposed action would have no significant or long-term adverse effects on the visual resources in the area.

3.1.7 Traffic

Currently, public river access is limited to just a few points: the Highway 20 Bridge at Parks Bar, Hammon Grove Park, Hallwood Boulevard, and the Highway 70 Bridge in Marysville (Community Center of Practice, 2011). The primary traffic use of the roads within the project area is low-density; mainly rural traffic. Existing haul routes in the project are used relatively frequently due to several gravel mining and ranching operations in the area. Many roads accessing the river are not well-maintained and may require specialized vehicles.

The Preferred Alternative will use existing roads and access points and may have temporary effects on recreation traffic entering and exiting the area. These effects would include temporarily increased traffic volume due to transport trucks traveling to and from the stockpiles and the placement site, but would not reduce the overall level of service along the roads.

3.1.8 Hazardous, Toxic, and Radiological Waste

The operation of motorized equipment at the LWM placement sites and trucks used for hauling gravel to the site would increase the risk of discharging hazardous substances (oil, diesel fuel, hydraulic fluids) into the environment.

Appropriate best management practices would be implemented in order to ensure that the risk of hazardous materials spills is minimized. The placement contractor would be properly trained to use standard spill prevention and cleanup equipment and techniques including rapid deployment of onsite spill absorption and retention materials.

3.1.9 Air Quality

The project area is located in the Sacramento Valley Air Basin, which is composed of Butte, Colusa, Glenn, Placer, Sacramento, Shasta, Solano, Sutter, Tehama, Yolo, and Yuba Counties (CARB 2007). The major air pollution problems in the Sacramento Valley Air Basin are high concentrations of oxidants and suspended particulates. Both pollutants frequently exceed air quality standards. The largest source of oxidants in the basin is motor vehicles, and the major source of suspended particulates is agriculture. Yuba County is designated as "unclassified" or "in attainment" for carbon monoxide, nitrogen dioxide, and sulfur dioxide. Yuba County is in "non-attainment" for ozone and PM_{10} (FRAQMD 2004, 2010).

The proposed LWM placement would have minor short-term effects on air quality in the area as a result of emissions and fugitive dust from vehicles used for loading, hauling, and placing the LWM. Operation of the conveyor equipment, a loading dozer, and woody material transport vehicles would produce emissions and PM_{10}, as well as increase fugitive dust from placement activities. To reduce impacts to air quality, best management practices with regards to equipment emissions and staging areas will be implemented. With the implementation of best management practices, no significant adverse effects with regards to air quality are anticipated.

3.1.10 Recreation

The primary recreation activities within the project area are fishing, boating, recreational exercise and wildlife viewing. Other activities may include hunting, swimming, and gold panning. Public access to the proposed placement sites is limited. Structures that protrude into a river channel, block the channel, or are designed to trap floating materials can be hazardous to recreational users and boaters (Saldi-Caromile et al. 2004). The woody material will be placed in the functional floodplain in areas subject to watering only during high stage flows when recreational users do not use the area. Although the proposed action could temporarily diminish the recreational experience of visitors due to the noise, dust, and in-water activities caused by the introduction of woody material, the project would have no significant adverse effects on recreation in the action area.

3.1.11 Noise

Construction activities from the proposed action, such as the running transport trucks and placement tractors would temporarily increase the noise levels near the action area. However, because there are not any sensitive receptors in the vicinity of the placement areas, increased noise will not be an issue.

3.2 Hydrology and Water Quality

3.2.1 Existing Conditions

Hydrology

The Yuba River watershed drains approximately 1,300 square miles on the western slope of the Sierra Nevada from a maximum height of 9,100 feet at Mt. Lola to 30 feet at the Yuba River's confluence with the Feather River at Marysville, California. The lower Yuba River extends approximately 24 miles from Englebright (at elevation 282 feet) to its confluence with the Feather River. The hydrology and fluvial geomorphology of the Lower Yuba River have been altered through anthropogenic influences. Construction of numerous upstream reservoirs has considerably altered the hydrologic regime of the Lower Yuba River. The effects of the water storage and subsequent releases for irrigation have been to reduce month-to-month flow variations in the river and have shifted the pattern of peak and minimum flows which combined with Lower peak flows and higher flows, have influenced the geomorphology of the Lower Yuba River. (DWR and Corps 2003). Several reservoirs store water and trap sediments to varying degrees. These include Englebright and Daguerre Point Dam, and New Bullards Bar Reservoir, which is located approximately 16 miles upstream of Englebright. The total storage capacity of the watershed is 1,377,000 acre-feet of water.

The flow in the Yuba River is partially controlled by New Bullards Bar Reservoir, the largest reservoir in the watershed, which was constructed by the YCWA in 1969. The YCWA stores water in New Bullards Bar Reservoir for release through the New Colgate powerhouse to provide in-stream flows for fishery enhancement, flood control, power generation, recreation, and to provide irrigation water to member units that have water rights and water service contracts. The YCWA has also supplied water from New Bullards Bar Reservoir for municipal, industrial, and fish and wildlife purposes through a number of temporary transfers lasting less than a year. Except for New Bullards Bar Reservoir, there is only minimal storage for retention of snowmelt within the basin. Hence, much of the spring and early summer flow to the Lower Yuba River is the result of uncontrolled snowmelt within the basin. In the summer and early fall, prior to the precipitation season, most of the flow in the Lower Yuba River is regulated by releases from New Bullards Bar and Spaulding Reservoirs.

Englebright Dam, marking the upstream boundary for the project area, is downstream of New Bullards Bar Reservoir. PG&E constructed the Narrows I powerhouse approximately ¼-mile below Englebright Dam. The YCWA constructed the Narrows II powerhouse immediately below Englebright Dam as part of its Yuba River Development Project. The combined operation

of Colgate, Narrows I, and Narrows II powerhouses, thus providing the principal regulation of the lower Yuba River.

Water that is released from New Bullards Bar Reservoir generally passes through Englebright Reservoir without modifying Englebright Reservoir elevations. Most of the lower Yuba River flow downstream of Englebright is released as outflow from hydroelectric power generation. Consequently, the 0.2 mile of river between Englebright and the Narrows II hydroelectric facility normally has standing water, except when Englebright is spilling (CDFG 1991).

Yuba River flows are measured at Smartville near Englebright Dam at the upper end of the lower Yuba River (Smartville Gage – U.S. Geological Survey [USGS] Station No. 11418000) and at Marysville, about six miles upstream of the mouth of the Yuba River (Marysville Gage – USGS Station No. 11421500). Data from the Yuba River's Smartville station indicate that flows average 2,600 cfs annually, with the highest flows in February and March.

Water Quality

As defined by the Central Valley Region of the California Regional Water Quality Control Board (CRWQCB), waters below Englebright Dam support numerous beneficial uses including irrigation, power generation, recreation, cold and warm freshwater habitat for resident fishes, and cold and warm freshwater migration and spawning habitat for anadromous fishes (CRWQCB 1998).

The overall water quality of the lower Yuba River is good and has improved in recent decades due to controls on hydraulic and dredge mining operations, and the establishment of minimum in-stream flows (Beak Consultants, Inc. 1989). Several factors that influence water quality in the river include rainfall and runoff patterns, quality of the irrigation water supply, crop acreages, crop cultural practices (pesticide and herbicide use), water management, and soil characteristics.

Dissolved oxygen concentrations, total dissolved solids, pH, hardness, alkalinity, and turbidity are well within acceptable or preferred ranges for salmonids and other key freshwater organisms (Table 1). The minimum, maximum, and average levels of pH, turbidity, dissolved oxygen, total organic carbon, nitrogen, phosphorus, and electrical conductivity for the Lower Yuba River are presented in Table 1 below. The data (27 samples) were collected on the Yuba River near Marysville over a 3-year period (1996 – 1998) (USGS 2002a, 2002b)

Table 1. Water Quality of the Lower Yuba River near Marysville, California.

Parameter	Minimum	Maximum	Average
pH (standard units)	7	7.8	7.5
Turbidity (mg/L)	1	153	30
Dissolved Oxygen (mg/L)	8	12.4	11.4
Total Organic Carbon (mg/L)	0.7	2.4	1.1
Nitrogen (mg/L)	0.05	0.14	0.07
Phosphorus (mg/L)	0.01	0.02	0.01
Electrical Conductivity (µS/cm)	44	105	73

Notes: mg/L = milligrams per liter. µS/cm = microsiemens per centimeter

3.2.2 Effects

Basis of Assessment. An alternative would be considered to have an adverse effect on hydrology if the action would alter local or regional existing flow patterns sufficient to introduce unintended substrate scour or deposition, mobilize local sediments, or substantially increase turbidity levels.

An alternative would be considered to have an adverse effect on water quality if it would substantially degrade water quality, contaminate a public water supply, substantially degrade or deplete ground water resources or interfere with groundwater recharge, or expose sensitive species or humans to substantial pollutant concentrations.

No Action Alternative. Current operations of water releases through Narrows I and Narrows II and uncontrolled overtopping of Englebright Dam during high-flow events, impacts the timing, frequency, duration, and quantity of water flowing downstream of the dam. If no action is taken, the water quality and hydrology in the lower Yuba River is expected to remain the same. Fresh water (surface and ground) would continue to be of good quality, and used for agriculture, recreational, and domestic purposes.

Preferred Alternative. The lower Yuba River hydrologic analysis includes a basic assessment of dams, hydrologic alteration by dams, a characterization of the flow regime, determination of geomorphically significant flows, and flood frequency analysis (Pasternack 2008). The relatively small amount of LWM placed in the river system would not be expected to have an adverse affect on the hydrology of the lower Yuba River, and is not expected to change the rate or efficiency flow of the river's hydrology.

The placement of LWM within the channel and adjacent banks may temporarily increase or contribute to the amount of suspended sediment in the water. Mechanized equipment and their accessory tools (booms, buckets, and claws) utilized in the placement process will not enter or disturb the 'wet' river channel. The proposed placement sites are located within hydraulically efficient areas of the lower Yuba River. Turbidity associated with the Preferred Alternative

activities would not exceed the CRWQCB objectives for turbidity in the Sacramento River Basin. The CRWCQB turbidity limits are as follows:

a. Where natural turbidity is between 0 and 5 Nephelometric Turbidity Unitis (NTUs), increases shall not exceed 1 NTU
b. Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent
c. Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs,
d. Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

Turbidity would not be expected to increase above naturally occurring background levels during the placement process. Adverse effects associated with the potential for turbidity would be minimized through the mitigation measures described below. Any potential turbidity associated with the placement process would be insignificant.

Clean Water Act

As required under the U.S. Environmental Protection Agency guidelines developed under Section 404(b)(1) of the Clean Water Act and found at 40 CFR Part 230 (404(b)(1) Guidelines), (Appendix B), an analysis was performed to determine the potential for adverse effects on the lower Yuba River aquatic ecosystem posed by the specific dredged or fill material discharge activities associated with the proposed placement of LWM. Under consideration were the potential short- and long-term effects of the proposed LWM placement on the physical, chemical, and biological components of the aquatic environment.

The 404(b)(1) Guidelines analysis concluded that the requirements of the guidelines would be met, with the inclusion of the appropriate and practicable discharge conditions to minimize pollution or adverse effects to the aquatic ecosystem, given the limited duration and the timing of the activity, as well as minimal area of effects.

Discharges into waters of the U.S. that require a Federal permit or license require certification in accordance with Section 401 of the Clean Water Act from the CRWQCB (Appendix C). The certification is necessary to ensure that the discharge would comply with the State's water quality standards that protect the beneficial uses of California's waters against quality degradation. The Section 401 Water Quality Certification which is in process may provide additional conditions that are required in order for the Corps to proceed with the project. . At a minimum the following best management practices will be included with the implementation contract specifications:

- If determined necessary, LWM would be washed to meet cleanliness values required under the Clean Water Act.
- The YCWA and downstream water districts would be notified of potential short-term turbidity increases during the LWM placement activity.
- Standard pollution prevention measures during construction.
- Erosion and sediment control measures, proper control of non-stormwater discharges.

The contractors will obtain and comply with the conditions of a state General Construction Activity Storm water Permit adopted by the SWRCB. The general permit is intended to ensure compliance with California's water quality objectives and water protection laws and regulations, including those related to waste discharges. Permit applicants are required to prepare and retain at the construction site a SWPPP that implements BMPs and a Water Pollution Control Program (WPCP). The storm water quality management program will address project construction and will specify control measures and BMPs designed to minimize sedimentation and release of products used during construction (e.g., petroleum products, paints, cements, etc.) into adjacent water bodies. Implementation of these measures would prevent significant adverse effects.

3.2.3 Mitigation

With the inclusion of the above measures, no significant adverse effects on hydrology or water quality are anticipated. No mitigation is required.

3.3 Biological Resources

3.3.1 Existing Conditions

Vegetation and Wildlife

The major vegetation types surrounding the project area include grassland, blue oak woodland, open gray pine woodland, and chaparral. Some of the dominant species include interior live oak, blue oak, gray pine, buttonbrush, blackberry, poison oak, wild oat, foxtail, and ripgut brome. The lower Yuba River channel within the Narrows Canyon is mostly devoid of vegetation. Small isolated clumps of shining willow, mulefat, and other riparian species are widely scattered along the otherwise barren rocky banks along the proposed gravel placement site and for approximately two miles downstream within the Narrows Reach.

Downstream of the Narrows Reach, past gold and gravel mining operations have left extensive piles of cobble and gravel, significantly reducing the quality and quantity of vegetation types within the Garcia Gravel Pit Reach. The dominant vegetation species along the flood plain consists of narrow strips of Fremont cottonwood, sandbar willow, red willow, and box elder. Individual elderberry plants may attain small tree stature in the vicinity of Daguerre Point Dam.

The riparian and adjacent upland oak/grassland habitat along the lower Yuba River supports a variety of wildlife species. Mammals that might be found within the project area include the California blacktail deer, western gray squirrel, black-tailed jackrabbit, California ground squirrel, gray fox, mountain lion, bobcat, coyote, spotted skunk, striped skunk, raccoon, long-tailed weasel, beaver, muskrat, river otter, Botta's pocket gopher, western harvest mouse, and numerous bats.

Reptiles and amphibians that are known to inhabit the project area include the western pond turtle, common garter snake, Pacific gopher snake, western rattlesnake, western fence

lizard, western whiptail lizard, western skink, horned lizard, western aquatic garter snake, California kingsnake, Pacific tree frog, and bull frog.

Bird surveys conducted between June and August 1999 by a Corps biologist included observations of California valley quail, mourning dove, scrub jay, mallard, Anna's hummingbird, American crow, turkey vulture, tree swallow, killdeer, belted kingfisher, and downy woodpecker (Corps 2001). Migratory birds and their habitats are protected under the Migratory Bird Treaty Act (MBTA), as amended (16 U.S.C703 et seq.). Several migratory birds, including waterfowl, shorebirds, song birds, hummingbirds, vultures, and raptors commonly are found along the lower Yuba River and around Englebright Lake, including red-tailed hawks and bald eagles. Songbirds, in particular, have the potential to utilize habitat located within the project area, including field sparrow, song sparrow, fox sparrow, orange-crowned warbler, tree swallows, and the lesser and American goldfinch.

Aquatic Fauna

Fisheries. Twenty-eight species are known to inhabit the lower Yuba River downstream of Englebright Dam (CDFG 1991a). Of these, eight are anadromous and spend a part of their life cycle in the lower Yuba River. The fish species that inhabit the lower Yuba River are shown in Table 6.

Descriptions of key species supported by the lower Yuba River are provided directly below. In addition, the lower Yuba River supports three species that are Federally listed as threatened: Central Valley steelhead, Central Valley spring-run Chinook (also State listed as threatened), and green sturgeon. This river also supports one Federal candidate species: Central Valley fall/late fall-run Chinook salmon which is discussed under the special status species section on page 20.

Sacramento Sucker. The Sacramento sucker is widely distributed through the Sacramento and Feather River systems. Sacramento suckers occupy waters from cold, high-velocity streams to warm, nearly stagnant sloughs. They are common at moderate elevations (600 to 2,000 feet). Sacramento suckers feed on algae, detritus, and benthic macroinvertebrates. They usually spawn for the first time in their fourth or fifth years. When they cannot move upstream and end up spawning in the lake habitat, they typically orient themselves near areas where spring freshets flow into the lake. They typically spawn in stream habitat on gravel riffles from late February to early June. The eggs hatch in three to four weeks, and the young typically live in the natal system for a couple of years before moving downstream to a reservoir or large river (Moyle 2002).

*Sacramento Pikeminnow***.** Sacramento pikeminnows occupy rivers and streams throughout the Sacramento–San Joaquin River system, including the lower Yuba River. Sacramento pikeminnows spawn in April and May, with eggs hatching in less than a week. Within a week of hatching, the fry are free swimming and schooling. Adult pikeminnows may feed on other fish, including juvenile pikeminnow, Chinook salmon, and steelhead, but according to Moyle (2002), are overrated as predators on salmonid species in natural environments. Pikeminnows tend to remain in well-shaded, deep pools with sand or rock substrate and are less

likely to be found in areas where there are higher numbers of introduced predator species such as largemouth bass and other centrarchid species.

Striped Bass. Striped bass are anadromous fish that have been an important part of the sport-fishing industry in the Delta. They were introduced into the Sacramento–San Joaquin estuary between 1879 and 1882 (Moyle 2002). Their range in the lower Yuba River is limited to the reach of the rivers below the dams. Striped bass may move into the lower reaches of the rivers year round but probably most often between April and June, when they spawn. The species tends to remain in deep, slow-moving water, where it has access to prey without having to expend a great deal of energy.

American Shad. American shad are anadromous fish that have been introduced into the Central Valley and have become established as a popular sport fish. The main American shad runs in California are in the Sacramento River up to Red Bluff and in the lower reaches of the river's major tributaries (American, Feather, and Yuba Rivers), as well as the Mokelumne and Stanislaus Rivers. American shad enter the lower Yuba River to spawn during the spring (primarily May and June) and support a seasonal fishery downstream of Daguerre Point Dam. Shad abundance increases at higher Yuba River flows relative to flows in the Feather and Sacramento Rivers.

Table 2. Fish Species that Inhabit the Lower Yuba River

Species Common Name *Scientific Name*	**Location**			**Native or Nonnative**		**Salmonid**
	Downstream of Daguerre	**Upstream of Daguerre**	**Unknown**	**Native**	**Non-native**	**Predator**
Anadromous Fish						
Fall-run chinook salmon *Oncorhynchus tshawytscha*	X	X		X		
Spring-run chinook salmon *Oncorhynchus tshawytscha*	X	X		X		
Central Valley steelhead *Oncorhynchus mykiss*	X	X		X		X
Green sturgeon *Acipenser medirostris*	X			X		
White sturgeon *Acipenser transmontanus*	X			X		
Pacific lamprey *Lampetra tridentate*	X	X		X		
Striped bass *Morone saxatilus*	X	X			X	X

Species Common Name *Scientific Name*	**Location**			**Native or Nonnative**		**Salmonid**
	Downstream of Daguerre	**Upstream of Daguerre**	**Unknown**	**Native**	**Non-native**	**Predator**
American shad *Alosa sapidissima*	X	X			X	X
Resident Fish						
Rainbow trout *Oncorhynchus mykiss*	X	X		X		X
Hardhead *Mylopharodon conocephalus*	X	X		X		X
Speckled dace *Rhinichthys osculus*	X	X		X		
California roach *Lavinia symmetricus*			X	X		
Sacramento sucker *Catostomus occidentalis*	X	X		X		
Sacramento pikeminnow *Ptychocheilus grandis*	X	X		X		X
Mosquitofish *Gambusia affinis*			X		X	
Largemouth bass *Micropterus salmoides*	X				X	X
Smallmouth bass *Micropterus dolomieui*	X				X	X
Green sunfish *Lepomis cyanellus*			X		X	
Bluegill *Lepomis macrochirus*			X		X	
Redear sunfish *Lepomis microlophus*			X		X	
Tule perch *Hysterocarpus traski*	X	X		X		
Riffle sculpin *Cottus gulosus*	X	X		X		
Common Carp *Cyprinus carpio*			X		X	
Brown Bullhead *Ameiurus nebulosus*			X		X	
White Catfish *Ameiurus catus*			X		X	
Channel Catfish *Ictalurus punctatus*			X		X	
Threespine stickleback *Gasterosteus aculeatus*			X	X		

Aquatic Macroinvertebrates. Qualitative aquatic macroinvertebrate sampling conducted by Corps biologists within the EDR reach of the lower Yuba River indicated that the aquatic macroinvertebrate community contains a high density of individuals, but low diversity in the numbers of invertebrate taxonomic orders and families represented. Table 3 identifies the aquatic macroinvertebrates that were field identified within the project site.

Table 3. Occurrence of Aquatic Macroinvertebrates within the Englebright Dam Reach of the Lower Yuba River.

	TRANSECT		
	Upstream reach	**Mid-reach**	**Downstream Reach**
Arthropoda			
Insecta			
Diptera			
Chironomidae	X	X	X
Simulidae	X		X
Empididae		X	
Ceratopogonidae	X	X	
Ephydridae		X	X
Unknown			X
Ephemeroptera			
Baetidae	X	X	X
Caenidae	X		
Leptophlebiidae	X		
Unknown	X	X	X
Crustacea			
Amphipoda	X	X	X
Chelicerata			
Arachnida		X	X
Annelida	X		
Nematoda	X		
Coelenterate			
Hydridae	X	X	X
Mollusca			
Gastropoda			
Physidae	X	X	
Planorbidae			X
Platyhelminthes	X		

Special Status Species

Special-status species that have the potential to occur in the vicinity of the project area were determined through a review of USFWS species lists and the California Natural Diversity Database (CNDDB) Rarefind electronic database (CDFG 2010) in the Smartville and Browns Valley U.S. Geological Survey 7.5 Minute Quads, as well as a review of the California Native Plant Society Inventory of Rare and Endangered Plants, 7th edition (online) (CNPS 2010).

Previous coordination with NMFS resulted in a Biological Opinion on the continued operation and maintenance of Englebright Dam and Reservoir, Daguerre Point Dam, and recreational facilities on and around Englebright Reservoir dated February 29th, 2012. Species consulted on in this report include spring-run Chinook salmon, California Central Valley Steelhead, and Southern DPS of North American Green Sturgeon.

Coordination with FWS resulted in lists of Federally-listed species having the potential to exist in the study area and a Coordination Act Report (CAR) dated May 31, 2012 (Appendix D). Species considered in this report include the Central Valley spring-run Chinook salmon and the Central Valley steelhead.

Each species on the list was evaluated for its potential to occur within the project area. Species that are not found in land cover types present in the project area, or whose known range falls outside of the project area, were eliminated from further consideration. Special-status species that are known to occur or have the potential to occur within the project area are further evaluated in the following sections.

Wildlife Species. Eight special-status wildlife species were identified as having the potential to occur in the project area or are known to occur in the project area. These wildlife species include:

- long-eared owl (*Asio otus*)
- Swainson's hawk (*Buteo swainsoni*)
- tricolored blackbird (*Agelaius tricolor*)
- western burrowing owl (*Athene cunicularia hypugea*)
- western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)
- giant garter snake (*Thamnophis gigas*)
- northwestern pond turtle (*Clemmys marmorata marmorata*)
- valley elderberry longhorn beetle (*Democerus californicus dimorphus*)

Long-eared Owl. The long-eared owl is designated as a California species of concern. The long-eared owl requires wooded areas for daytime roosting with adjacent open areas to forage. Their habitat requirements do not change between breeding and wintering although during breeding season the owls become very territorial and subsequently dispersed, whereas during the winter months they roost communally in groups of 7 to 50 birds. In the west and southwest, long-eared owls are found in deciduous woods near lakes and streams where growth of climbing vines provide dense roosting cover during winter. The long-eared owl does not build

its own nest and instead will use old crow, magpie, squirrel, or other large abandoned stick nests. Irregularly, it will also use a natural cavity in a tree, cliff, or on the ground.

A CNDDB records search did not identify occurrences of long-eared owls within the project area. However, a nest tree is located several miles south of the project area in the Spenceville Wildlife Area operated by the California Department of Fish and Game (CDFG) (CDFG 2010). Formal surveys have not been performed to determine whether this species is currently present and nesting within the project area.

Swainson's Hawk. The Swainson's hawk is designated as a California threatened species. In the Central Valley, the Swainson's hawk nests primarily in riparian areas adjacent to agricultural fields or pastures, although it sometimes uses isolated trees or roadside trees. The Swainson's hawk nests in mature trees; preferred tree species are valley oak, cottonwood, willow, sycamore, and walnut. Nest sites typically are located near suitable foraging areas. The primary foraging areas for Swainson's hawk include open agricultural lands and pastures.

The riparian forest in the vicinity of Daguerre Point Dam is dominated by native woody riparian tree species that provide potential nest sites for Swainson's hawk. A CNDDB records search identified one occurrence of a breeding pair in the vicinity of the project area (CDFG 2010). This occurrence was east of Yuba City off Hammonton-Smartville Road. The Swainson's hawk is also a permanent resident downstream of the project area near the confluence of the Yuba River with the Feather River. Formal surveys have not been performed to determine whether this species is currently present and nesting within the project area. However, Swainson's hawk is expected to forage in the lower portion of the project area.

Western Burrowing Owl. The western burrowing owl is designated as a California species of concern. It is a permanent resident in the Central Valley. Suitable habitat for burrowing owl occurs in ruderal habitats and near agricultural lands throughout the study area. The western burrowing owl nests and roosts in abandoned ground squirrel and other small-mammal burrows, as well as artificial burrows (culverts, concrete slabs, and debris piles). The owl's breeding season is from March to August and peaks in April and May.

A CNDDB records search identified one historical occurrence of a breeding pair in the vicinity of the project area (CDFG 2010). This 1906 occurrence was in the area now known as the Goldfields adjacent to Daguerre Point Dam. Formal surveys have not been performed to determine whether this species is present and nesting in the project area.

Tricolored Blackbird. The tricolored blackbird is designated as a California species of concern. The tricolored blackbird inhabits open valleys and foothills, and may be found in streamside forests, alfalfa and rice fields, marshes, and along reservoirs. This blackbird usually nests in marshes, but may also nest in willow and blackberry thickets and on the ground in clumps of nettles. They forage in wet meadows, rice and alfalfa fields, and in rangelands. They commonly roost in trees or marshes. Whether they are roosting, foraging, or nesting, these birds are always found in very large flocks. The tricolored blackbird both nests and winters in interior valleys from southern Oregon (east of the Cascades) to northwest Baja California. Once

abundant in Yuba County, the tricolored blackbird has been possibly eliminated from the county and breeds only in a few scattered areas in California and Oregon.

A CNDDB records search identified a historical tricolored blackbird colony site near the confluence of Dry Creek and the Yuba River. This site has since been developed as an RV Park. The last tricolored blackbird sighting in this area was April 23, 1994 (CDFG 2010).

Western Yellow-Billed Cuckoo. The Western yellow-billed cuckoo is State listed as an endangered species and is a candidate for Federal listing. This species requires large patches (25 acres or larger) of mixed old-growth riparian forests composed of willow and cottonwood trees with dense understory. Dense cottonwood riparian forest is present in the vicinity of Daguerre Point Dam. However, the riparian forest exists as narrow patches found upstream and downstream of Daguerre Point Dam. A CNDDB records search did not identify occurrences of western yellow-billed cuckoos within the project area (CDFG 2010). In addition, statewide surveys conducted in 1999/2000 by USGS and USFWS documented no individuals nesting downstream within the Feather River channel.

Giant Garter Snake. The giant garter snake is Federally and State listed as threatened. The giant garter snake is endemic to emergent wetlands in the Central Valley. Within the project vicinity, the giant garter snake is still presumed to occur in the rice production zones of Yuba, Sutter, Butte, Colusa, and Glenn Counties. The species' habitat includes marshes, sloughs, ponds, small lakes, and low-gradient waterways such as small streams, irrigation and drainage canals, and rice fields (58 FR 54053, October 20, 1993). The giant garter snake is active from approximately May through October and hibernates during the remainder of the year.

The giant garter snake requires adequate water with herbaceous, emergent vegetation for protective cover and foraging habitat. All three habitat components (cover and foraging habitat, basking areas, and protected hibernation sites) are needed. Riparian woodlands and large rivers typically do not support giant garter snakes because these habitats lack emergent vegetative cover, basking areas, and prey populations.

A CNDDB records search did not identify occurrences of giant garter snake within the project area (CDFG 2010). Formal surveys have not been performed to determine whether this species is currently present within the project area.

Northwestern Pond Turtle. The northwestern pond turtle is designated as a California species of concern. The northwestern pond turtles inhabit permanent or nearly permanent waters with little or no current. The channel banks of inhabited waters usually have thick vegetation, but basking sites such as logs, rocks, or open banks must also be present. Eggs are laid in nests along sandy banks of large slow-moving streams or in upland areas, including grasslands, woodlands, and savannas. Nest sites are typically found on a slope that is unshaded, has a high clay or silt composition, and soil at least 4 inches deep.

Ponded water bodies and some agricultural ditches and canals in the vicinity of the project area provide suitable habitat for this species. A CNDDB records search identified three occurrences of northwestern pond turtles in the vicinity of the project area (CDFG 2010). Two

occurrences were associated with natural stream courses and agricultural ditches adjacent to a potential LWM haul route on Peoria and Scott Forbes Road

Valley Elderberry Longhorn Beetle. Elderberry shrubs are the host plant of the valley elderberry longhorn beetle (VELB), which is Federally listed as threatened. Current information on the habitat of the beetle indicates that it is found only with its host plant, the elderberry. Adult VELB feed on foliage and are active from early March through early June. The beetles mate in May, and females lay eggs on living elderberry shrubs. The larvae after hatching burrow in the stems of the shrubs within which they pupate. Before they pupate and metamorphose into an adult, the larva creates a circular exit hole, through which it emerges as an adult.

Elderberry shrubs in the Central Valley are commonly associated with riparian habitat, but also occur in oak woodlands and savannas and in disturbed areas. There are several CNDDB records of VELB occurrences in vicinity of Daguerre Point Dam (CDFG 2010).

Fish Species. The following special-status fish species and designated critical habitats were identified as having the potential to occur or are known to occur in the project area. These fish species and designated critical habitats include:

- Central Valley fall/late fall-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Central Valley steelhead (*Oncorhynchus mykiss*)
- Green sturgeon (*Acipenser medirostris*)

During the early to mid-1900s, upstream migration by anadromous fish species was adversely affected by ineffective fish ladders existing at Daguerre Point Dam (Corps 2001). Low streamflows and high water temperatures in the Yuba River also had negative impacts on the species. Measures were implemented to address these problems, including reconstruction of the Daguerre Point Dam fish ladders in 1950, establishing flow fluctuation regulations (500 cfs/hour) below Englebright in 1955, and reducing fish entrainment at water diversion facilities beginning in 1984. The commencement of operations at New Bullards Bar Dam in 1970 improved conditions for salmonids in the lower Yuba River by providing cooler water temperatures and more reliable flows in the summer and fall (NMFS 2005b).

Fall/Late Fall-run Chinook Salmon. On September 16, 1999 (64 FR 50393), NMFS downgraded the fall-run Chinook salmon to candidate status. There is no State protection for fall-run or late fall–run Chinook salmon. NMFS indicated that the Central Valley fall-run and late fall–run Chinook salmon are a single evolutionarily significant unit (ESU), therefore they are discussed together in this section.

Fall-run Chinook salmon are the most abundant anadromous fish in the Central Valley. The total fall-run Chinook salmon population during the November 2007 to April 2008 period, as derived from escapement surveys, was 10,222 fish (CDFG 2010a).

Optimal water temperatures for egg incubation for Chinook salmon are 44 to 54°F (Rich 1997). Newly emerged fry remain in shallow, lower velocity edgewaters, particularly where

debris collects and makes the fish less visible to predators (CDFG 1998). The duration of egg incubation and time of fry emergence depend largely on water temperature. In general, eggs hatch after a three to five month incubation period, and alevins (yolk-sac fry) remain in the gravel until their yolk-sacs are absorbed (two to three weeks).

Juvenile Chinook salmon move out of upstream spawning areas into downstream habitats in response to many factors, including inherited behavior, habitat availability, flow, competition for space and food, and water temperature. The numbers of juveniles that move, and the timing of movement, are highly variable. Storm events and the resulting high flows appear to trigger movement of substantial numbers of juvenile Chinook salmon to downstream habitats.

Adult fall-run Chinook salmon migration and holding generally occurs in the Lower Yuba River beginning in July and peaking in November. By the end of November, typically greater than 90 percent of the run has entered the river. Timing of the adult Chinook salmon spawning activity is strongly influenced by water temperatures (YCWA 2006).

Spring-Run Chinook Salmon. NMFS designated the Central Valley spring-run Chinook as threatened on September 16, 1999 (64 FR 50393). On February 5, 1999, the California Fish and Game Commission listed spring-run Chinook salmon as threatened under CESA. Critical habitat for this ESU, which includes the Lower Yuba River, was designated on September 2, 2005.

Spring-run juveniles may emigrate as fry soon after emergence, rear in their natal streams for several months prior to emigration as young–of-the-year, or remain in their natal streams for extended periods and emigrate as yearlings. Triggers for downstream movement are similar to those described for fall-run Chinook salmon above. Recent fish trapping operations in the lower Yuba River indicate that large numbers of Chinook salmon fry leave the river in December to March (CDFG unpublished data). Movement of juvenile spring-run Chinook salmon in the Feather River is probably similar to the Yuba River. A second, smaller peak of smolt-sized fish emigrates in April to June.

Historically, spring-run Chinook salmon were the second most abundant run of Central Valley Chinook salmon (Fisher 1994). They occupied the headwaters of all major river systems in the Central Valley where there were no natural barriers. However, habitat has been in a steady decline since the 1920s due to migration barriers, hydraulic mining, and water diversions. The total spring-run Chinook salmon population during the November 2007 to April 2008 period, as derived from escapement surveys, was 6,158 fish (CDFG 2010a).

As of 2008, the Feather River Fish Hatchery (located in Yuba River) population had dropped significantly to 1,418 Feather River fish (CDFG 2010a). Part of the significance of this fishery is that it supports natural reproduction that is not augmented with hatchery transplants, although CDFG did conduct a one-time stocking of a small number of juvenile spring-run fish from the Feather River Hatchery into the Lower Yuba River in 1980 (CDFG 1991a).

Spawning surveys and adult monitoring at the fish ladders on Daguerre Point Dam conducted by CDFG have detected the continued presence of a small population of spring-run

Chinook salmon migrating into the Lower Yuba River. In the spring of 2004, at total of 413 adult Chinook salmon were detected migrating up past Daguerre Point Dam from April through June (NMFS 2005b). The migration timing and location of these fish indicate that they were all Central valley spring-run Chinook salmon. During 2005, 1,021 Chinook salmon (including grilse) were observed (YCWA 2006). During the 2008 period, a total of 2,268 Chinook salmon were observed (LYRA 2010). During the 2009 to 2010 redd survey conducted by the Lower Yuba River Accord River Management Team, a total of 2,221 redds were observed from Daguerre Point Dam to Englebright Dam.

According to Pasternack (2008), the Englebright Dam Reach was found to be lacking habitat for spring-run Chinook salmon spawning, even though this is where many such fish come and attempt to spawn on the bedrock. The upper half of this reach lacks self-sustainable conditions and is purely governed by bedrock canyon geometry (Pasternack 2008).

On February 16, 2000, NMFS designated critical habitat for the Central Valley spring-run Chinook salmon ESU (63 FR 11482) (NMFS 2002). Critical habitat consists of water, substrate, and adjacent riparian zone of accessible estuarine and riverine reaches. Critical habitat for Central Valley spring-run Chinook is designated to include all river reaches accessible to Chinook salmon in the Sacramento River and its tributaries in California (NMFS 2002). Also included are river reaches and estuarine areas of the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Excluded are areas above specific dams or above longstanding naturally impassable barriers.

Central Valley Steelhead. NMFS reaffirmed the threatened status of the Central Valley steelhead on January 5, 2006, to include all naturally spawned Central Valley steelhead populations below natural and manmade impassable barriers in the Sacramento and San Joaquin Rivers and their tributaries, as well as two artificial propagation programs: the Coleman National Fish Hatchery and Feather River Hatchery steelhead hatchery programs. The critical habitat final designation was published on September 2, 2005 (70 FR 52488), with an effective date of January 2, 2006.

Historically, steelhead spawned and reared in most of the accessible upstream reaches of Central Valley rivers, including the Yuba, Feather, and Sacramento Rivers and their perennial tributaries. Compared with Chinook salmon, steelhead generally migrated farther into tributaries and headwater streams where cool, well-oxygenated water was available year-round. Declines in steelhead abundance have been attributed largely to dams that eliminated access to most of their historic spawning and rearing habitat, and restricted steelhead to less suitable habitat below the dams. Other factors that have contributed to the decline of steelhead and other salmonids include habitat modification, over-fishing, disease and predation, inadequate regulatory mechanisms, climate variation, and artificial propagation (NMFS 2006).

Since 1975, the steelhead run size has not been estimated, but is believed to be “stable” and supports a significant recreational fishery (McEwan and Jackson 1996). CDFG stopped

stocking steelhead into the lower Yuba River in 1979, and currently manages the river to protect the natural steelhead production through strict "catch-and-release" fishing regulations. During the 2008 period, a total of 424 steelhead were observed passing through the VAKI system at Daguerre Point Dam (LYRA 2010).

Currently, upstream migration in the lower Yuba River occurs from August through March and peaks in October and February (CDFG 1991a). Central Valley steelhead spawning generally occurs from January through April in the lower Yuba River (CDFG 1991a). Egg incubation time in the gravel is determined by water temperature, with optimal egg incubation temperatures reported to range from 48°F to 52°F (CDFG 1991b). Steelhead fry usually emerge from the gravel two to eight weeks after hatching, usually between February and May, but sometimes into June (CDFG 1991b). Newly emerged steelhead fry move to shallow, protected areas along streambanks and then move to faster, deeper areas of the river as they grow. Juvenile steelhead feed on a variety of aquatic and terrestrial insects and other small invertebrates.

Juvenile steelhead rear throughout the year and may spend from one to three years in freshwater before migrating to the ocean; juvenile steelhead rear in the Lower Feather and Bear Rivers throughout the year (CDFG 1991b). Smolting steelhead generally migrate from March to June (CDFG 1991b).

Critical habitat for Central Valley steelhead is designated to include all river reaches accessible to listed steelhead in the Sacramento River and San Joaquin Rivers and their tributaries in California (NMFS 2002). Also included are river reaches and estuarine areas of the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Excluded are areas of the Merced River confluence and areas above specific dams or above longstanding naturally impassable barriers.

Green Sturgeon. On April 7, 2006, NMFS published the final rule to designate the southern DPS of green sturgeon as threatened effective June 6, 2006 (71 FR 17757). There is no State protection for this species. There are confirmed observations of both white sturgeon (*Acipenser transmontanus*) (CDWR 2005b) and green sturgeon (*Acipenser medirostris*) (NMFS 2005a) in the Feather River near the mouth of the Yuba River, and unconfirmed species observations of sturgeon in the Yuba River below Daguerre Point Dam (NMFS 2005b). As part of ongoing sturgeon monitoring efforts in the Feather River Basin, Cramer Fish Sciences conducted roving underwater video surveys in the Lower Feather and Lower Yuba rivers. Preliminary results, verified by green sturgeon experts concluded that green sturgeon were observed center channel at the edge of the bubble curtain below Daguerre Point Dam (Cramer Fish Sciences, 2011). These sightings may be an anomaly because of the greater amount of cold water flows in the Yuba River 2011 (Doug Grothe, personal communication, 2012). As of June 28th, 2012 fish surveys by Cramer Fish Sciences have yet to identify any green sturgeon downstream of Daguerre Point Dam (Doug Grothe, personal communication, 2012).

Although life stages in fresh water may last up to two years, green sturgeon are the most marine of sturgeon species, coming into rivers mainly to spawn. Adults and juvenile sturgeon are benthic feeders, but may also take small fish. Juveniles in the Delta estuary primarily feed on opossum shrimp and amphipods (Moyle 2002).

Incidental capture of larval green sturgeon in salmon out-migrant traps indicates that the lower Feather River may be a principal spawning area; green sturgeon may also spawn in the mainstem Sacramento River. Adults have been reported as far upstream as Red Bluff, and young have been recorded in a number of places downstream. Some spawning may also take place in the lower San Joaquin River because young green sturgeon have been taken at Santa Clara Shoal in the Brannan Island State Recreational Area. Preferred spawning substrate is likely large cobble, but can range from clean sand to bedrock. Eggs are broadcast and externally fertilized in relatively fast water and probably in depths greater than approximately 10 feet. The importance of water quality is uncertain, but a small amount of silt is known to prevent the eggs from adhering to each other, thus increasing survival (Moyle 2002).

Essential Fish Habitat. Essential Fish Habitat (EFH) is the aquatic habitat (water and substrate) necessary for fish to spawn, breed, feed, or grow to maturity (NMFS 2002) that will allow a level of production needed to support a long-term, sustainable commercial fishery and contribute to a healthy ecosystem. For the Sacramento River watershed, the aquatic areas identified as EFH for Chinook salmon are within the hydrologic unit map numbered 18020109 (Lower Sacramento River) and 18020112 (upper Sacramento River to Clear Creek) (NMFS 2002). The upstream extent of Pacific salmon EFH in the Yuba River is to Englebright Dam at river mile 23.9.

Plant Species. Only one special-status plant species, Brandegee's Clarkia (*Clarkia biloba* ssp. *Brandegee*), was identified as having the potential to occur in the project area, or is known to occur in the project area. The California Native Plant Society lists the plant with a status of 1B.2, meaning that the taxon is "rare, threatened, or endangered in California and elsewhere; seriously threatened in California" (CDFG 2010). This plant species is discussed below.

Clarkias are colorful California native annuals. There are about 40 species of *Clarkia*, almost all in western North America. Brandegee's Clarkia is found in dry habitats below 2,500 feet elevation in six counties of the northern Sierra. It typically grows on gravelly slopes above creeks and rivers and along roadsides. Brandegee's Clarkia may bloom from May to July depending on weather conditions and location. A CNDDB records search identified one occurrence of Brandegee's Clarkia in the vicinity of the project area (CDFG 2010). This occurrence (recorded in 1971) was located east of the Sierra Foothill Research and Extension Center near Scott Forbes Road.

3.3.2 Effects

Vegetation and Wildlife

Basis of Assessment. An alternative would be considered to have an adverse effect on vegetation and wildlife if it would result in a reduction in vegetation or wildlife populations or substantially degrade surrounding habitats.

No Action Alternative. If no action is taken, the existing conditions would be expected to remain the same. There will not be any adverse impact to vegetation and wildlife in the area if the LWM Plan is not implemented.

Preferred Alternative. The proposed action would not have any adverse effect on vegetation or wildlife due to the limited scope and duration of the action and the lack of riparian vegetation in the vicinity of the selected LWM placement sites. The proposed action would not involve removal of any existing vegetation. Any wildlife displaced by this action would be expected to return to the area soon after the action is completed. Furthermore, the placement areas would be adjacent to existing gravel operations and are frequented by recreational users, meaning that existing vegetation and wildlife are already subject to occasional disturbances.

Aquatic Fauna

Basis of Assessment. An alternative would be considered to have an adverse effect on fisheries resources if it would result in a reduction in fish populations or substantially degrade the water quality of fish habitat by increasing the concentrations and total amounts of suspended solids or toxic substances.

No Action Alternative. If no action is taken, the supply of woody material along the lower Yuba River would not be augmented by placement of additional LWM. As a result, there would not be a potential for a corresponding improvement of juvenile salmonid rearing habitat in the lower Yuba River. In the long-term, upstream dams will continue to disrupt downstream transport from the upper watershed, therefore disrupting the flow and accumulation of woody materials acting as fish habitat. The no action alternative would thereby be noncompliant with the BO.

Preferred Alternative. The deposition of LWM directly into the low flow channel may include minimal short-term effects such as localized and temporary disturbance, displacement, or impairment of feeding, migration, or other behaviors by adult and juvenile salmon and steelhead from noise, suspended sediment, turbidity, and sediment deposition generated during LWD placement activities. There would be no short-term adverse effects on fish due to placement of LWM in seasonal floodplains that are not inundated at the time of placement.

The 2012 NMFS BO directed the Corps to reintroduce LWM in the Lower Yuba River to create additional salmon habitat. There would be no long-term adverse effects on fish. There would be, however, long-term beneficial effects, as the instream LWM provides escape cover and relief from high current velocities for juvenile salmonids and other fishes.

Special Status Species

Basis of Assessment. An alternative would be considered to have an adverse effect on special status species, critical habitat, or EFH if it would result in the "take" of a Federally or State-listed threatened or endangered species, adversely affect designated critical habitat, or substantially affect any other special status species, including degradation of its habitat.

No Action Alternative. Within the Yuba River Basin, several dams upstream of Englebright have altered the downstream movement of large wood into the lower Yuba River. If no action is taken, the Corps will not be compliant with the terms of the BO. The supply of woody material along the lower Yuba River would not be augmented by placement of additional LWM. As a result, there would not be a potential for a corresponding improvement of juvenile salmonid rearing habitat in the lower Yuba River. According to the BO, the vast majority of salmonid spawning and rearing habitat in the Yuba River was first impacted by gold mining activities and then totally cut off by Englebright Dam in 1941. In the long-term, upstream dams will continue to disrupt downstream transport from the upper watershed, therefore disrupting the flow and accumulation of woody materials acting as fish habitat. There is not anticipated to be any negative impact on listed terrestrial vegetation or wildlife if no action is taken.

Preferred Alternative. As there is no suitable habitat for any of the wildlife or plant species in or near the potential placement sites, the proposed action would have no adverse effects on any of these species. Correspondence from FWS in the form of a CAR (Appendix D) states their support for the implementation of this project, which would increase beneficial habitat for the Central Valley spring-run Chinook salmon and the Central Valley steelhead.

Although there will not be in-water work, in the short term there could be a slight rise in suspended sediment and turbidity levels if woody material is placed directly within the river. There is the potential for a reduction in growth rates of salmonids if suspended sediment and turbidity levels substantially exceed ambient levels for prolonged periods. In the long-term, LWM placement is not likely to adversely affect Federally listed species or their designated critical habitat, including the threatened Central Valley spring-run Chinook salmon *(Oncorhynchus tshawytscha),* threatened Central Valley steelhead (*O. mykiss),* the respective designated critical habitats for these salmonid species, and the threatened southern Distinct Population Segment of North American green sturgeon *(Acipenser medirostris).*

The 2012 NMFS BO directed the Corps to reintroduce LWM in the Lower Yuba River to create additional salmon habitat. Whether the placement of instream LWM offers more favorable habitat for escape cover and relief from high current velocities, and whether more favorable fish habitat translates to increased biological production remains uncertain. The deliberate placement of wood in streams and floodplains to form discrete structures at specific locations may create habitat immediately, or may take years to develop (Saldi-Caromile et al. 2004).

3.3.3 Mitigation

Vegetation and Wildlife

The Corps was directed by NMFS to develop a plan for the management of LWM to modify local flow dynamics to increase cover and diversity of instream habitat for the primary purpose of benefitting juvenile salmonid rearing. Because the project is anticipated to have either a beneficial impact or no impact to vegetation and wildlife, no mitigation is proposed.

Aquatic Fauna

As there would be overall beneficial effects on fish, no mitigation would be required.

Special Status Species

The timing of the LWM placement depends on the proximity of heavy equipment (such as haul trucks) to the river. If it is not necessary to use heavy equipment very close to river beds, there will be no seasonal limitation to the placement of LWM. However, if it is necessary to use heavy equipment close to the river bed, there is a potential for noise and vibration to disturb fish species. Therefore, to avoid or minimize potential effects on these listed species, the proposed placement of LWM would be scheduled for a late-fall timeframe. The timing of the action was determined by both coordination with NMFS, and by the natural history of the salmonids. By then, Central Valley spring-run Chinook salmon would have moved away from the placement site to seek more favorable spawning gravels. It is expected that any remaining fish would temporarily avoid the woody materials placement sites by moving out of the affected area. Any elevated turbidity would be temporary and localized, and would not have long-term, permanent effects.

Because placement of LWM in the Lower Yuba River will create beneficial habitat for salmonids, no additional mitigation would be required.

3.4 Cultural Resources

3.4.1 Existing Conditions

To date, no archaeological surveys have located prehistoric sites within the project area. Archival research was conducted in 2004 by ENTRIX, a Corps consultant, at the California Historical Resources Information System, North Central Information Center, Sacramento, to locate all previously recorded sites situated within a 1/8-mile radius of the project area. This review resulted in the identification of four previously recorded archaeological sites probably associated with Gold Rush Era placer mining (CA-YUB-144-H, CA-YUB-626-H, CA-YUB-669-H, and CA-YUB-736-H) located within 1/8-mile radius of the project area. Of these, site CA-YUB-669-H is situated adjacent to the project area. None of the four sites are listed on or have been determined to be eligible for listing on the National Register of Historic Places. In addition, none of the sites are listed on the California Register of Historic Resources. No testing or further archaeological investigation has occurred at any of the sites.

At least four in-field reconnaissance level archaeological surveys have been conducted within and adjacent to the project area. The first, entitled "A Reconnaissance Archeological and Historical Site Survey of Selected Portions of the Parks Bar Lake Project Alternative, Marysville Lake Project," was reported in November 1974 and covered the entire project area. This survey initially located the four sites referred to in this section. The second survey, entitled "Cultural Resources of the Marysville Lake, California Project (Parks Bar Site), Yuba and Nevada Counties, California," was completed in August 1978. This survey covered the entire project area and re-visited the previously recorded sites. The third survey was conducted in 2002 by YCWA to analyze the effects of a proposal to install a full-flow bypass structure on the Narrows II hydropower facility adjacent to the 2007 gravel pilot placement site. The survey included the exterior of the power plant, the immediate surrounding area, and the locations that would be used for staging and spoils disposal. No cultural resources were identified at that time. It was determined that the steep slopes of the canyon made this location unsuitable for early historic or prehistoric occupation despite the area's proximity to the Yuba River (YCWA 2006). On March 19, 2007, a fourth in-field reconnaissance level archaeological survey was conducted by a Corps' archaeologist within and adjacent to the project area for the pilot gravel injection project (Corps 2007). The area of potential effect (APE) was determined to be the Lower Yuba River channel and the paved haul roads from the commercial gravel site to the base of Englebright Dam.

3.4.2 Effects

Basis of Assessment. An alternative would be considered to have an adverse effect on cultural resources if it would diminish the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Types of effects include physical destruction, damage, or alteration; isolation or alteration of the character of the setting; introduction of elements that are out of character with the property; neglect; and transfer, lease, or sale of the property.

No Action Alternative. Under this alternative, there could be some effects to cultural resources. Natural processes such as erosion, root and rodent intrusion, and flooding could affect sites by exposing them to the elements and vandals.

Preferred Alternative. In accordance with 36 CFR 800.3.a.1, the Corps determined that the project action has no known potential to cause effects to cultural or historic properties within the project area's APE. The haul roads are not historically significant, and there are no historic properties present in the lower Yuba River channel. There are additionally no cultural resources or historic properties identified within the project area's APE. Since this undertaking does not have the potential to cause effects on cultural resources or historic properties, the Corps has no further obligations under Section 106 of the National Historic Preservation Act of 1966. Should any prehistoric (arrowheads, mortar, or human bones) or historic artifacts (glass, ceramics, metal, or nails) be discovered during implementation of the proposed action, work activities would be stopped until mitigation is determined in consultation with the SHPO and Native American representatives.

3.4.3 Mitigation

As the proposed action would have no adverse effects on cultural resources or historic properties, no mitigation would be required.

4.0 Growth-Inducing Effects

An action agency must consider the indirect effects of a proposed action when preparing an EA. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate (40 CFR 1508.8[b]). The proposed action would have no effect on population growth or densities. Growth in the project area would proceed as projected in the Yuba County general plans.

5.0 Cumulative Effects

NEPA requires that an EA discuss project effects which, when combined with the effects of other projects, could result in significant cumulative effects. NEPA defines a cumulative effect 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" (40 CFR 1508.7).

Currently, there are multiple planned and ongoing resource restoration projects within the Yuba River watershed with the goal of increasing and stabilizing anadromous fish populations. These projects include improved sediment management, fish screening alternatives at diversions, habitat improvement and restoration, and improved fish passage. The California Department of Water Resources, the Lower Yuba River Technical Working Group, and the Lower Yuba River Accord River Management Team are all also supporting development of long-term restoration planning to assist in prioritizing actions to complete restoration and enhancement of salmonid habitat. The proposed action, in combination with past, present, and potential future restoration actions on the lower Yuba River, would contribute to the overall health and vigor of the watershed.

6.0 Compliance with Relevant Environmental Laws and Regulations

Bald Eagle Protection Act of 1940, as amended, 16 U.S.C. 668-668d, 54 Stat. 250. *Full Compliance*. This law provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The proposed action would have no adverse effects on bald or golden eagles.

Clean Air Act of 1972, as amended, 42 U.S.C. 7401, et seq. *Full Compliance*. The Corps completed an analysis of air quality effects from the proposed action and determined that

the estimated emissions and PM_{10} would not exceed Federal *de minimus* thresholds. The Corps has also determined that the proposed action would have no adverse effect on the future air quality of the project area. Therefore, no conformity determination would be required.

Clean Water Act of 1972, as amended, 33 U.S.C. 1251, et seq. *Full Compliance.* The proposed action includes placement of materials on seasonal floodplains that are not inundated at the time of placement. Because LWD will not be placed directly in the water, placement is not anticipated to cause temporary suspension of sediments at the proposed LWM placement site. A Section 404(b) (1) evaluation for the project determined compliance, with the inclusion of the appropriate and practicable discharge conditions to minimize pollution or adverse effects to the aquatic ecosystem..

Endangered Species Act of 1973, as amended, 16 U.S.C. 1531, et seq. *Full Compliance.* Previous consultation with NMFS resulted in a Biological Opinion on the continued operation and maintenance of Englebright Dam and Reservoir dated February 29th, 2012. The introduction of LWM to contribute to salmonid juvenile rearing habitat was one of the requirements of the BO, and was determined to have a beneficial impact on listed fish species.

Executive Order 12989, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. *Full Compliance.* This Executive Order states that Federal agencies are responsible to conduct their programs, policies, and activities that substantially affect human health of the environment in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination under such programs, policies, and activities because of their race, color, or national origin. The proposed action is in compliance with this Executive Order and would not affect any minority or low-income communities.

Executive Order 13112, Invasive Species. *Full Compliance.* This order directs federal agencies to: prevent the introduction of invasive species; detect and respond rapidly to and control such species; not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions. The proposed action would not result in the introduction or spread of any new invasive or noxious plant species.

Fish and Wildlife Coordination Act of 1958, as amended, 16 U.S.C. 661, et seq. *Full Compliance*. The Corps has been closely coordinating with USFWS. The USFWS coordination is included in the Final EA.

Magnuson-Stevens Fishery Conservation and Management Act. *Full Compliance*. Chinook salmon species that may be affected by the proposed action are evaluated in this EA. The Corps has determined that the LWM placement project would have no significant adverse effects on these species, nor would it likely destroy or adversely modify the designated critical

habitat for these species. This EA serves as the Corps EFH Assessment for Chinook salmon. The Corps has closely coordinated with NMFS regarding the proposed action, which was recommended as one of the conditions of the BO to improve juvenile salmonid rearing habitat in the area.

Migratory Bird Treaty Act of 1936, as amended, 16 U.S.C. 703 et seq. *Full Compliance*. The Migratory Bird Treaty Act implements various treaties and conventions between the United States, Canada, Japan, Mexico, and Russia, providing protection for migratory birds as defined in 16 U.S.C. 715j. The proposed action is in compliance with provisions of this Act.

National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, et seq. *Full Compliance*. Based on the findings in this EA, the District Engineer has prepared a Finding of No Significant Impact.

National Historic Preservation Act of 1966, as amended. *Full Compliance*. Section 106 of this act requires a Federal agency to consider the effects of Federal undertakings on historical and archeological resources. There are no cultural resources or historic properties identified within the project area's APE. Since this undertaking does not have the potential to cause effects on cultural resources or historic properties, the Corps has no further obligations under Section 106 of the National Historic Preservation Act of 1966.

Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq. Full Compliance. The purpose of the 'Wild and Scenic Rivers Act is to preserve and protect wild and scenic rivers and immediate environments for the benefit of present and future generations. The Lower Yuba River has not been designated as a component of either the Federal or State Wild and Scenic Rivers systems.

7.0 Agencies and Persons Consulted.

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8.0 Public Notice

In accordance with NEPA regulations and the Corp's procedures for implementing NEPA, a notice of availability of the FONSI will be sent to concerned agencies, organizations, and the public, as identified in Appendix E (40 CFR 1501.4(e)(1); 33 CFR 230.11).

9.0 Conclusions

Based on this EA and agency coordination, the proposed Large Woody Material Management Pilot Study project as a whole would not result in a significant adverse effect on the environmental resources in the project area, including threatened and endangered species, and other wildlife and vegetation.

10.0 List of Preparers

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APPENDIX A

Lower Yuba River Large Woody Material Management Plan

Lower Yuba River
Large Woody Material
Management Plan

U. S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814

December 15, 2011

Table of Contents

1.0 Introduction

Instream large woody material (LWM) provides escape cover and relief from high current velocities for juvenile salmonids and other fishes (**Figure 1**). Snorkeling observations in the lower Yuba River have indicated that juvenile Chinook salmon had a strong preference for near-shore habitats with instream woody material (JSA 1992). As part of the Central Valley Project Improvement Act Anadromous Fish Restoration Program, the United States Fish and Wildlife Service (USFWS) (1995) identified the need for increasing the amount of instream woody material to improve juvenile salmonid rearing habitat in the lower Yuba River. Beak (1996, as cited in CALFED and YCWA 2005) recommended the addition of instream woody material as a habitat enhancement action to increase annual salmonid smolt production in the lower Yuba River.

Figure 1. Juvenile salmonids associated with LWM.

It has been reported by the lower Yuba River Fisheries Technical Working Group (CALFED and YCWA 2005) that little instream woody material occurs in the lower Yuba River, because upstream dams block some downstream transport of woody material, and because of the lack of riparian vegetation throughout much of the lower Yuba River. However, the CALFED and YCWA (2005) report did not indicate that any surveys or studies were conducted to support these statements. Some woody material may not reach the lower Yuba River due to collecting on the shoreline and sinking in Englebright Reservoir. However, Englebright Dam does not substantively block woody material from reaching the lower Yuba River because there is no woody material removal program implemented for Englebright Reservoir, and accumulated woody material therefore spills over the dam during uncontrolled flood events (R. Olsen, Corps, pers. comm. 2011). Nonetheless, few pieces of large wood reportedly are found within the reach of the lower Yuba River extending from Parks Bar to Hammon Bar, presumably due to upstream dams disrupting downstream transport from the upper watershed and the overall lack of supply and available inventory along the riparian corridor of the river downstream of Englebright Dam (USFWS 2010).

On November 21, 2007, National Marine Fisheries Service (NMFS) issued a long-term biological opinion (BiOp) regarding the U.S. Army Corps of Engineers' (Corps) operation and maintenance of Daguerre Point and Englebright dams. The BiOp included an incidental take statement (ITS) with several terms and conditions. Term and condition D.2. requires the Corps to "*develop and implement a long term program to replenish large woody materials in the lower Yuba River*." In accordance with this term and condition, the Corps must "*determine an effective method of*

replenishing the supply of large woody material ... back into the lower Yuba River, in a manner that provides instream cover, invertebrate flood sources, and micro-habitat complexity…"

In October of 2011, the Corps submitted a Biological Assessment (BA) to NMFS assessing the effects of ongoing operations and maintenance of Englebright and Daguerre Point dams in the lower Yuba River. The BA included a conservation measure addressing LWM. The conservation measure in the BA stated that the Corps will: (1) develop a plan or policy for management of LWM, consistent with recreation safety needs; (2) conduct a pilot program to identify suitable locations and evaluate the efficacy of placing large instream woody material to modify local flow dynamics to increase cover and diversity of instream habitat for the primary purpose of benefitting juvenile salmonid rearing; and (3) based upon the outcomes of the pilot program, develop and implement a long-term Large Woody Material Management Plan (LWMMP) for the lower Yuba River, anticipated to occur within one year following completion of the pilot program.

This LWMMP has been prepared consistent with term and condition D.2. in the BiOp and the conservation measure presented in the BA, with technical assistance provided by HDR Engineering, Inc. It includes the following key elements.

- Metrics for assessing LWM value and selection criteria
- Design considerations including LWM sources, collection location(s), collection methods, transportation methods, and stockpiling location(s).
- Description of a LWMMP Pilot Program

1.1 Goals of the LWMMP

The overall goal of this plan is to provide and manage LWM in the lower Yuba River downstream of Englebright Dam to improve habitat for juvenile salmonids and other non-listed fish species, by improving cover and diversity of instream habitat for rearing juvenile anadromous salmonids, and provide increased cover, invertebrate food sources, and micro-habitat complexity. The Corps recognizes that the accomplishment of this goal has to occur while maintaining recreation and public safety values.

2.0 LWMMP Design Considerations

The application of LWM to improve habitat for juvenile salmonids and other non-listed fish species in the lower Yuba River considers several design characteristics including the source of LWM, collection methods, size and type criteria for selection, access and transportation of LWM, and placement techniques for optimal benefit of LWM.

LWM is a naturally occurring feature in stream channels. LWM may alter existing hydrodynamics, habitat availability and use, and a redistribution of species (Saldi-Caromile et al. 2004). The deliberate placement of wood in streams and floodplains to form discrete structures at specific

locations may create habitat immediately, or may take years to develop (Saldi-Caromile et al. 2004). Wood can be a naturally occurring feature anywhere in a stream system where trees are present in the adjacent riparian zone or upstream watershed. However, there is risk associated with adding mobile wood to certain stream types. For example, as the velocity and depth of flow increases, so do the buoyant and drag forces acting to transport LWM. And as the width and depth of the stream increases, the likelihood of wood getting wedged between banks, or held up on bank and channel obstructions decreases. Consequently, the risk of wood transport (though not necessarily project failure) increases with channel gradient, channel depth, and channel width (Saldi-Caromile et al. 2004). Ideal locations for wood replenishment include less developed watersheds where infrastructure is not located within or immediately adjacent to the stream (Saldi-Caromile et al. 2004).

2.1 LWM Availability and Collection

Within the Yuba River Basin, several dams have altered the downstream movement of large wood into the lower Yuba River. New Bullards Bar Dam and Reservoir is located relatively low in the watershed and functions as the dominant flood control and water supply reservoir in the Yuba River Basin (CALFED and YCWA 2005). The drainage area of the North Yuba Basin is approximately 489 square miles (mi^2), which is the largest drainage area of the three Yuba River sub-basins (i.e., North Yuba River Basin, South Yuba River Basin, and Middle Yuba River Basin). Since completion of New Bullards Bar Dam in 1969, the movement of LWM from the North Yuba River Basin into the Yuba River has been reduced. A cable-and-buoy line (floating boom) spans New Bullards Bar Reservoir just upstream of the dam, which captures woody material that has entered and traveled downstream on the reservoir's surface.

The woody debris that accumulates on New Bullards Bar Reservoir consists of various materials, including leaves, twigs, branches, logs, root-wads, and trees. However, the quantity, size, and type of LWM entering New Bullards Bar Reservoir on an annual basis are not well known. In general, the most commonly available floating wood is generally small diameter material, with large diameter trees occurring less frequently and usually associated with flood events.

A flood event that occurred December 31, 2005 reportedly resulted in approximately 6,300 cubic yards (yd^3) of floating woody material on the surface of New Bullards Bar Reservoir (**Figure 2**). The Yuba County Water Agency (YCWA) obtained a Federal Emergency Management Agency (FEMA) grant to gather up and remove the woody material, and about 4,800,000 pounds of wood was chipped and hauled to Oroville to be used as fuel for a biomass generation unit.

Because the availability of LWM is related to magnitude, duration and frequency of large floods (City of Tacoma 2004), it is likely that the quantity and quality of LWM entering New Bullards Bar Reservoir from the North Yuba River vary inter-annually. Research quantifying the large wood loading in the Yuba River Basin is presently underway by Anne Senter, a UC Davis student advised by Dr. Pasternack (USFWS 2010). Preliminary estimates have quantified the volume of wood stored in New Bullards Bar Reservoir at two times - 1998 and 2006.

Figure 2. Large Woody Material in New Bullards Bar Reservoir (YCWA 2006).

Aerial photography examinations resulted in an estimated 34,400 yd^3 of wood accumulated on New Bullards Bar Reservoir during 1998, and an estimated 110,000 yd^3 accumulated on New Bullards Bar Reservoir during 2006 (A. Senter unpublished data, as cited in USFWS 2010).

YCWA presently manages the LWM that is washed into New Bullards Bar Reservoir from the North Yuba River Basin upstream. Although no formal LWM Management Plan has been established, YCWA methods currently involve pushing the floating LWM into shallow coves of New Bullards Bar Reservoir using tug boats, and subsequently gathering and removing the dry LWM from the reservoir using a boom (G. Rabone, YCWA, pers. comm.). USFWS (2010) reports that accumulated wood from New Bullards Bar Reservoir is burned every 1 to 3 years.

Consistent with past LWM removal efforts on New Bullards Bar Reservoir, YCWA will continue to manage LWM on New Bullards Bar Reservoir by pushing the floating LWM using tug boats into shallow coves that have landside access along New Bullards Bar Reservoir, and subsequently stockpiling the LWM on the shoreline using a boom. The Corps will coordinate with YCWA to gather some of the stockpiled LWM along New Bullards Bar Reservoir and place it onto transport trucks for relocation downstream in the lower Yuba River. It is anticipated that LWM that is not

selected for enhancement downstream will be burned on the shoreline of New Bullards Bar Reservoir.

For the Pilot Program (see Section 4.0, below), the Corps will use LWM available from the stockpiles located along New Bullards Bar Reservoir, which is anticipated to be dominated by coniferous species. However, if the amount, type and size of available LWM from the stockpiled sources along New Bullards Bar Reservoir are insufficient to meet the needs of the Pilot Program, then the LWMMP will consider augmentation of LWM from New Bullards Bar Reservoir with LWM from orchard trees, if a suitable source and quantity can be identified.

2.1.1 LWM Selection Criteria

LWM is highly variable in size, texture, plant species, and degree of decomposition (SAFCA 1999). Not all the woody material entering New Bullards Bar Reservoir is expected to be suitable for meeting the goal of this LWMMP. In general, some LWM that enters reservoirs may not be removed from a reservoir such as wood that is habitat for snag and log dependent species and provide greater ecological benefit by remaining in place rather than being removed and stockpiled (Puget Sound Energy 2011). For example, large trees along a reservoir shoreline riparian zone that fall into the reservoir are not necessarily removed if their rootwad rests more than a couple of feet above the full pool surface elevation and prevents the wood from floating away. For the LWMMP, LWM selected for removal from the stockpiles located along the shoreline of New Bullards Bar Reservoir will be based on the size and type criteria identified below.

Size

A review of available literature indicates that LWM size criteria is highly variable, although two general size criteria methods were identified: (1) specific length and diameter dimensions of LWM irrespective of channel width; and (2) length and diameter criteria that are scaled to the width of the channel under consideration (PG&E 2008). Several studies that specify a minimum length and diameter define LWM as being wood with a diameter of at least 10 centimeters (cm) along 2 meters (m) of their length, or rootwads less than 2 m long with a minimum bole diameter of 20 cm, and may include whole trees with rootwad and limbs attached, pieces of trees with or without rootwads and limbs, and cut logs (Saldi-Caromile et al. 2004). USFWS (2010) identified large wood (conifers or hardwoods) as greater than or equal to 16 inches (in) in diameter and greater than or equal to 15 feet (ft) in length. Fox (2004, as cited in CRH 2007) specifies a mid-point diameter of 10 cm or greater, a length of 2 m or greater, and protruding into the bankfull channel is required for designation as LWM (CRH 2007). Additionally, a log with a rootwad is considered a “key piece” because it is likely to be stable during bankfull flows and influences many of the physical and ecological characteristics (CRH 2007). Similarly, the 1998 CDFG Stream Habitat Restoration Manual (Flosi et al. 1998) identifies a single piece of large wood greater than 12 inches in diameter and 6 ft long as LWM, and small woody material as any amount of small wood that is less than 12 in diameter. Other studies are less specific and focus on LWM that ranges between 10-20 cm in

diameter, 1-3 m in length, or both (e.g., Robison and Beschta 1990; Bilby and Ward 1991; Fausch and Northcote 1992; Crispin et al. 1993; Beechie and Sibley 1997, as cited in SAFCA 1999).

Other management plans suggest that the length of LWM selected for placement must be shorter than the bankfull width of the river, due to transport considerations and the potential for log jams to occur downstream following mobilizing flood events (Flanagan 2004 and Wohl 2000, as cited in Energy Northwest 2005). However, this LWM size criterion may not be relevant to the lower Yuba River in consideration that the river generally is much wider (e.g., 300-600 ft) than the rivers addressed in these other plans. LWM is defined in the USFS Region 5 Stream Condition Inventory (SCI) protocol as all pieces of wood lying within the bankfull width of the channel that measures one half bankfull width or longer (SMUD undated). Cramer et al. (2002) suggests size of trees and rootwads have a minimum trunk diameter 0.5 × bankfull discharge depth, and minimum tree length 0.25 × bankfull discharge width. Again, however, these types of criteria and considerations are generally most relevant to smaller streams.

Size criteria in this LWMMP are more inclusive to provide a greater range of options for future monitoring, and to facilitate comparison with other existing data sets on LWM load in streams. Therefore, based on a review of the literature, this LWMMP defines LWM as pieces of wood that are minimally 12 inches in diameter, and 6 ft long. The maximum length of LWM pieces will correspond to that length with is capable of being transported by truck.

Type

In addition to size of the LWM, the type influences stability of the LWM and is defined as the species, geometry, and presence versus absence of rootwad (Saldi-Caromile et al. 2004). Decay rates are climate dependent, due to the requirements of the fungi responsible for aerobic decomposition of wood. Differences in the durability between coniferous and hardwood species can be quite dramatic when not fully submerged. Several studies conducted in the northern hemisphere recommend coniferous species be used for all key pieces of wood that are critical to structure stability and function and may not be continuously submerged. Lacking tannins that slow decay, deciduous wood decays much more rapidly and may lose structural integrity within a decade, depending on its size and the degree of wetting and drying that occurs (Saldi-Caromile et al. 2004).

Widely spreading or multiple-stemmed hardwoods are more prone to forming snags than the more cylindrical conifers which are more readily transported and accumulate as racked members, and may beneficially enhance recruitment of other woody material (CRH 2007). Complex woody material structures that feature numerous branches and high stem density locally decrease flow velocity, inducing sediment deposition. Accordingly, materials should be selected that have numerous branches, being careful not to break or remove branches during wood placement (Corps 2007).

Hilderbrand et al. (1997) suggest using trees with branches or rootwads left intact because they are less likely to move when flow is high (SAFCA 1997). Root tissue is more resistant to decomposition and provides increased stability than trunks and stems (SAFCA 1999). The

Sacramento River Bank Protection Project (SAFCA et al. 2011) states that selected trees for LWM placement should have a structurally complex canopy and/or root mass containing many branches and roots of various sizes. Trees that provide optimal LWM have many fine- and medium-sized branches or roots. A dense network of smaller roots and branches provides optimal cover for target fish species. Emphasis should be placed on selecting those trees with the greatest volume, density, and complexity of branches or roots. For example, SAFCA et al. (2011) state that trees to be imported to the Sacramento River Bank Protection Project sites should have a minimum trunk diameter of 10 in diameter at breast height (DBH) and a minimum total length of 25 ft (including trunk, canopy, and/or root wad) (DBH is a standard measurement of trunk diameter as measured 4 ft above the ground). Therefore, for the LWMMP, pieces with rootwads will be preferentially selected from the materials stockpiled along the shoreline of New Bullards Bar Reservoir.

Quantity

Several different methods of identifying the appropriate loading levels of LWM have been used in various localities, including proportion of adjacent riparian, volume per stream channel area, emulation of natural loading, and pieces per length. Classifying and inventorying LWM within a stream is a key step in a LWM management plan. A LWM assessment provides a baseline on the amount and type of LWM and the locations along a stream. The assessment also helps to quantify the impact of LWM on the designated uses of the stream. Following a LWM assessment, management options should be evaluated. Any management action needs to fit within what is expected of the stream through its designated uses and what is feasible based on a stream's characteristics. Other key factors that determine management options include cost and the experience of the responsible parties designing and/or implementing management activities (CRH 2007).

As a part of the Corps' compliance with term and condition D.2. of the BiOp and as part of a conservation measure identified in the BA, the Corps will: (1) develop a plan or policy for management of LWM, consistent with recreation safety needs; (2) conduct a pilot program to identify suitable locations and evaluate the efficacy of placing large in-stream woody material to modify local flow dynamics to increase cover and diversity of instream habitat for the primary purpose of benefitting juvenile salmonid rearing, anticipated to occur no later than one year of NMFS issuance of a new biological opinion for this project; and (3) based upon the outcomes of the pilot program, develop and implement a long-term large woody material management plan for the lower Yuba River, anticipated to occur within one year following completion of the pilot program.

Under Agreement No. W912HZ-11-2-0004, the Corps is a federal agency partner in the University of California's Office of Research Cooperative Ecosystem Studies Unit (CESU). Through the CESU, the Corps coordinated with Dr. Greg Pasternack at UC Davis in the spring of 2011 regarding the potential development of a multi-disciplinary research study that would investigate ecologic, hydrologic, and geomorphologic considerations associated with large woody material adaptive management actions. In September 2011, a one-year study was approved. A contract will be awarded and the study implemented in spring 2012. It is anticipated that the results of this study

will provide the following information: (1) a streamwood budget for the Yuba River watershed above Englebright Dam; (2) a detailed accounting of large woody material distribution and abundance; and (3) potential design concepts for instream hydraulic structure placement in the Englebright Dam Reach of the lower Yuba River. The technical information provided by this research would be used to facilitate the development and implementation of a large woody material adaptive management plan for the lower Yuba River, including identifying the appropriate quantities of LWM to be placed in the lower Yuba River.

2.2 New Bullards Bar Reservoir Access Site

The Corps will coordinate with YCWA regarding access to, and availability of LWM at accessible shoreline sites around New Bullards Bar Reservoir prior to LWM collection activities. In their determination of suitable access locations related to the collection of LWM, the Corps and YCWA will consider equipment size, available space, as well as minimizing impacts to recreational facilities. Recreational facilities located along New Bullards Bar Reservoir include Emerald Cove Marina, Hornswoggle Group Camp, Schoolhouse Family Camp, Dark Day Campground, Dark Day Boat Ramp, Garden Point Campground, Madrone Cove Campground, and Cottage Creek Boat Ramp.

2.3 LWM Transportation Methods

LWM collected from the surface of New Bullards Bar Reservoir and placed in stockpiles along the shoreline that meets the suitable criteria stated above (see Section 2.1.1) will be transported downstream to placement sites identified below in Section 2.4. The equipment needed to move the LWM can include self-loading log trucks, excavators, end dumps, skidders and dump trucks (Saldi-Caromile et al. 2004). The LWM will be transported to downstream areas along the lower Yuba River via truck.

The Corps will identify a Licensed Timber Operator, who is licensed under the Forest Practice Act law and is authorized to conduct forest tree cutting and removal operations, for the loading, transporting and unloading of LWM collected from New Bullards Bar Reservoir.

2.4 LWM Placement

Placement of LWM in the lower Yuba River is anticipated to temporarily improve habitat for juvenile salmonids and other non-listed fish species in the lower Yuba River directly at the placement site, in addition to areas downstream as transport of LWM occurs during high flow conditions. The following factors will be considered in identifying potentially suitable LWM placement sites: (1) within the boundaries of the lower Yuba River frequently occurring inundation zone (approximately 880 to 5,000 cfs); (2) located at the downstream end of a meander bend, the head of a side channel, the apex of a bar, in backwatered reaches, pools, or relatively low energy

sites, consistent with LWM stability guidelines presented in Saldi-Caromile et al. (2004); (3) consistent with potential habitat rehabilitation sites identified in the *Rehabilitation Concepts for the Parks Bar to Hammon Bar Reach of the Lower Yuba River* by USFWS (2010) and *Potential Juvenile Rearing Habitat Expansion Actions in the Lower Yuba River, Appendix L to the Final Habitat Expansion Plan* by PG&E (2010); (4) provide access for heavy equipment; and (5) sites under federal land management or where the Corps can obtain necessary real estate rights. The Corps will conduct a real estate assessment for each of the potential sites as part of the Pilot Program (see Section 4.0).

Additionally, it is preferable to place appropriate LWM at bank locations where juvenile salmonids are most likely to occur so that they will benefit most from the LWM. The LWM placement sites identified in this LWMMP are approximate locations for improving juvenile salmonid rearing habitat on the lower Yuba River. Implementation ultimately relies on the experience and judgment of the equipment operators or supervisor to select the specific location and orientation of each individual log and the methods for placing LWM.

Factors influencing the structural stability of LWM clusters include magnitude, duration, and frequency of flooding, as well as natural geomorphic processes in the channel. Hydrologic assessment methods are useful in identifying the most appropriate bank position for placement of LWM (SAFCA 1999). According to Pasternack (2009), the lower Yuba River experiences floods capable of inducing geomorphic changes to the mainstem, which potentially would influence downstream transport of placed LWM complexes. Additionally, a review of 2D-hydrologic modeling developed by the Yuba Accord River Management Team (RMT) indicates that the frequently occurring inundation zone is defined by the inundated channel between the low flow (e.g., 880 cfs) and nearly annual high flow (e.g., 5,000 cfs) boundaries.

LWM stability guidelines presented in Saldi-Caromile et al. (2004) suggest that optimal placement locations for LWM include the downstream end of a meander bend, the head of a side channel, at the apex of a bar, in backwatered reaches, pools, or relatively low energy sites. The upper portions of the bars or inlets where LWM placement sites are identified would remain undisturbed in order to preserve natural hydrologic and geomorphic structure. LWM will be placed and allowed to potentially move under high flow conditions. In some locations, large wood would promote the geomorphic processes of scour and deposition, further enhancing a heterogeneous mosaic of aquatic habitat types. This LWMMP identifies suitable LWM placement sites, consistent with optimal placement locations identified by Saldi-Caromile et al. (2004) and within the boundaries of the lower Yuba River frequently occurring inundation zone (e.g., the floodplain between 880-5,000 cfs).

Two studies were primarily referenced in the identification of approximate LWM placement sites in this LWMMP, including *Rehabilitation Concepts for the Parks Bar to Hammon Bar Reach of the Lower Yuba River* by USFWS (2010) and *Potential Juvenile Rearing Habitat Expansion Actions in the Lower Yuba River, Appendix L to the Final Habitat Expansion Plan* by PG&E (2010). USFWS (2010) reports that the approximate 4-mile reach of the lower Yuba River downstream of the

Highway 20 Bridge, often referred to as the Parks Bar to Hammon Bar reach, is relatively dynamic because of the availability of sediment and the potential for the alignment of this sediment to be altered during large magnitude floods in the reach. Further, USFWS (2010) states that the entire reach between Parks Bar and Hammon Bar could be suitable for placing large wood along the margins of the active main channel, side channels and backwaters. The Parks Bar to Hammon Bar reach (**Figure 3**) is considered a focal reach for restoration because of its proximity to the primary spring-run Chinook salmon and steelhead spawning reaches, favorable rearing temperatures, and the limited current extent of off-channel habitat (PG&E 2010). Pending the results of the five factors considered in identifying potentially suitable LWM placement sites, additional sites upstream of the Highway 20 Bridge also may be considered.

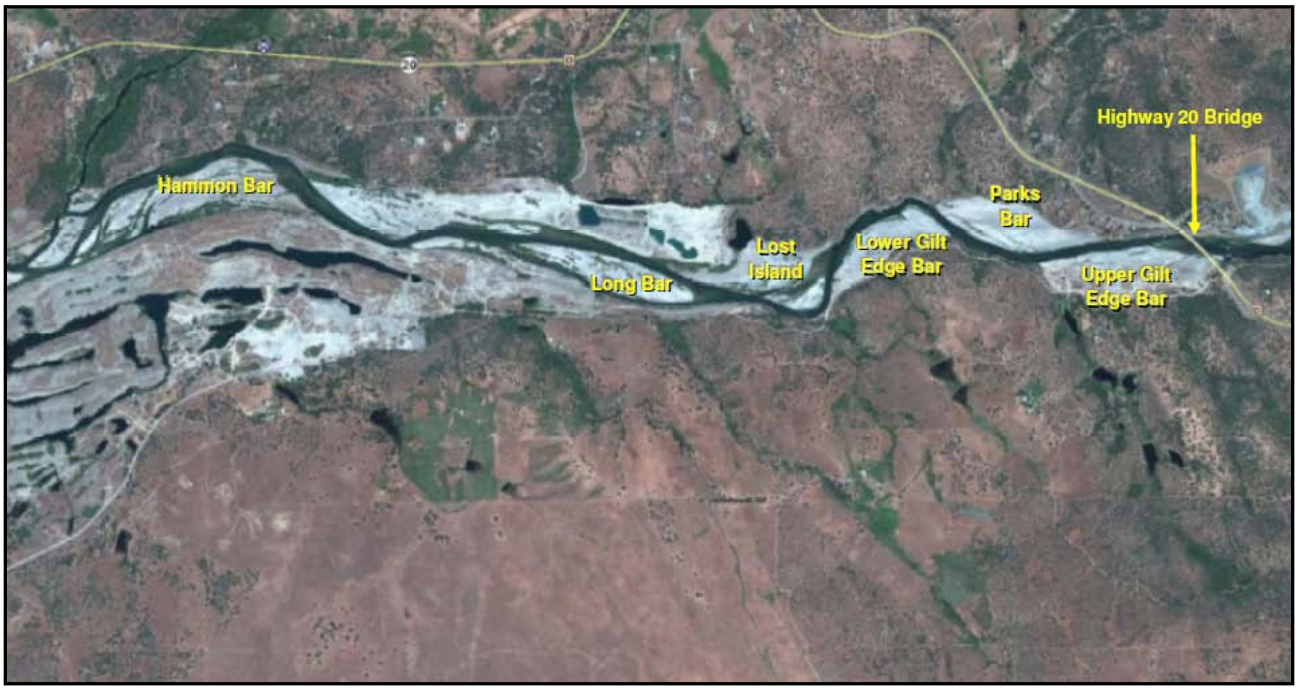

Figure 3. Proposed LWM placement areas within the Parks Bar to Hammon Bar reach of the lower Yuba River (Modified from PG&E 2010).

At the upstream portion of the Parks Bar to Hammon Bar reach, the river is laterally confined by bedrock canyon walls; however, in the downstream portion of the reach, the river is laterally confined to approximately the same width by the remnant sediment (i.e., training walls) of historic gold dredging activities (USFWS 2010). The functional valley width in the reach ranges between approximately 310 ft to 1,420 ft, with a mean width of approximately 980 ft and a mean gradient of 0.19% (G. Pasternack unpublished data). LWM placement guidelines presented in Saldi-Caromile et al. (2004) indicates that constructed log jams work well in alluvial channels having less than a 2% slope and may not be appropriate in alluvial channels with high sediment loads that can cause frequent channel avulsions and lateral migrations that can abandon log jams shortly after

construction. In consideration of these criteria, the Parks Bar to Hammon Bar reach is identified in this LWMMP as suitable for placing LWM to improve the availability of juvenile salmonid rearing habitat.

Potential habitat enhancement actions proposed in PG&E (2010) include large wood placement. The general design concept for the rearing habitat enhancement actions proposed by PG&E (2010) were informed by aerial photography and extensive field surveys of off-channel habitats reportedly conducted beginning in 2007. PG&E (2010) reports that many of the surveyed floodplain habitats support fry for variable periods of time following winter flows, but do not provide suitable rearing habitat after flows recede because they become too shallow, too warm, or lack sufficient cover to protect fry from piscivorous birds and other predators. Locations identified by PG&E (2010) as suitable for juvenile salmonid rearing habitat expansion projects include Upper Gilt Edge Bar, Lower Gilt Edge Bar, Lost Island, and Hammon Bar (Figure 3). These habitat expansion projects generally consisted of provision of currently unavailable side-channel and/or backwater habitat areas, and not LWM placement *per se*. However, these locations may be appropriate as LWM placement sites in consideration of the selection criteria, particularly heavy equipment access and proximity to salmonid spawning and rearing areas.

Although USFWS (2010) stated that the entire stream margin along this 4-mile reach of the lower Yuba River is potentially suitable for LWM placement, specific locations have been identified for LWM placement, corresponding to sites identified in *Rehabilitation Concepts for the Parks Bar to Hammon Bar Reach of the Lower Yuba River (*USFWS 2010) and *Potential Juvenile Rearing Habitat Expansion Actions in the Lower Yuba River, Appendix L to the Final Habitat Expansion Plan* (PG&E 2010). Within the 4-mile reach of the lower Yuba River that has been identified for LWM placement, vehicular access to the river is limited, and the transport of LWM would require the Corps to use roads that traverse privately owned lands. Therefore, site selection, LWM stockpiling and placement within the frequently inundated floodplain will be dependent on whether or not the Corps is able to obtain permission from private landowners for an easement or right-of-way access.

Lower Gilt Edge Bar

Potential LWM placement sites are located along the southern edge of Lower Gilt Edge Bar, which is a stable point bar that starts near the low water elevation at the top of the bar and extends well above the low water elevation at the downstream end of the bar (USFWS 2010). Based on assessment of aerial photography, this location has been stable in recent years, and may be a suitable candidate for LWM placement, as long as there are no real estate constraints with this location.

Hidden Island (also referred to as Lost Island)

Hidden Island, which is also referred to as Lost Island, is located on the northern side of the lower Yuba River downstream of Lower Gilt Edge Bar, where a high flow side channel is present

(USFWS 2010). Inspection of historic aerial photography indicates that the side channel used to remain inundated and longitudinally connected at lower river discharges and has presumably become disconnected at lower discharges (USFWS 2010). Field observation indicates that at present the high flow side channel becomes longitudinally connected at mainstem flows >3,300 cfs (USFWS 2010). LWM would be placed along the banks and within the side channel, predominantly in the most upstream and downstream region where the side channel joins the lower Yuba River and backwater habitat may occur at lower flows. USFWS (2010) hypothesize that the historic side channel has converted into a high flow channel due to incision of the mainstem and/or deposition on the bar. It is uncertain how long this side channel will be maintained at this location, if the main channel is indeed incising in this area or a future flood deposits on the bar. In addition, access and cooperation the north bank land owner is unknown and will need to be pursued.

Hammon Bar

LWM placement could occur within and along the existing backwater on the southern edge of Hammon Bar. Along the upper portion and some edges of the existing backwater, woody riparian vegetation is well established. LWM would be placed throughout the length of Hammon Bar, along existing backwater and riparian vegetation, as well as along vegetation planted during recent riparian restoration activities. Additionally, the western end of Hammon Bar is characterized by a series of remnant channels that intersect the bar and lead to a large side channel sustained by groundwater flows from the river and the Yuba Goldfields. This side channel supports high densities of juvenile Chinook salmon, steelhead, and other native fishes during spring and summer. LWM placement could occur in the large side channel to provide additional cover. It should be noted that potential placement of LWM on Hammon Bar would need to avoid disruption of the recently implemented riparian vegetation enhancement pilot project being undertaken by USFWS.

2.4.1 Placement Configuration

Large wood in interaction with channel margins has been shown to create a variety of microhabitats and affect geomorphic processes in a way that supports natural riparian recruitment and diversity (Gerhard and Reich 2000 in USFWS 2010). Juvenile salmonids are known to show preference for habitats with cover and velocity refugia associated with large wood (Roni and Quinn 2001). Large wood has been found to locally improve spawning conditions (Merz 2001; Senter and Pasternack 2010).

LWM is found in many natural configurations. In general, placement of in-channel structures has had mixed results in providing sustained habitat improvement and one factor influencing the persistence or risk of such projects is the dynamics or flood potential of the stream. Placement of LWM should allow for potential transport under high flow conditions. LWM placement also can be configured to provide specific habitat benefit, such as provision of low velocity refuges during high flow conditions (**Figure 4**).

Corps (2007) suggests that combinations of woody materials with stone and living plant materials are common. Rootwads may be placed at spaced intervals or in an interlocking fashion so they may be considered either intermittent or continuous types. Intermittent structures provide greater aquatic habitat diversity than continuous protection. The configuration of LWM structures should consider the dominant erosion processes operating on the site (Shields and Aziz 1992 in Corps 2007), as well as key habitat deficiencies such a lack of pools, cover, and woody substrate. Intermittent structures could be built by stacking whole trees and logs in crisscross arrangements that emulate natural formations, creates diverse physical conditions, and traps additional debris. Alternatively, LWM may be placed as single logs and angled upstream. Large accumulations are frequently the result of a key log that is transported or falls into the stream at a low energy point, becomes anchored in that location, and collects additional debris that is transported from upstream (Saldi-Caromile et al. 2004; CRH 2007).

Figure 4. Example of large wood placed on the floodplain will provide low velocity refuge during high flows (Finney Creek in Skagit County, Washington, as shown in Saldi-Caromile et al. 2004).

The specific influence of woody debris on velocity and habitat formation is determined by LWD type and orientation within the channel. For example, a log with a root-wad in a stream will create a scour pool on the upstream end of the root-wad and a sediment bar on the downstream end (Saldi-Caromile et al. 2004). In larger streams, LWM creates scour pools, controls floodplain construction and side channel development (Saldi-Caromile et al. 2004; CRH 2007).

The stability of LWM once it enters a stream is determined by the interaction of the forces resisting its transport downstream and the forces driving its transport downstream. Examples of resisting forces would be the LWM's weight and friction on the streambed and channel banks. Driving forces would be the drag from the flowing water on the LWM and the buoyancy of the wood (Saldi-Caromile et al. 2004). Large wood debris is stable when the resistive forces are greater than the driving forces (CRH 2007). Often, the most stable LWM structure in a stream is a log with an attached rootwad (Fox 2001, as cited in CRH 2007). Channel constrictions and bends, or locations where the channel depth is less than the buoyant depth, tend to be the locations where mobilized LWM becomes trapped (Braudrick and Grant 2001, as cited in Energy Northwest 2005).

Moving a log that is perpendicular to the stream channel to a forty-degree angle to the bank, away from the flow will increase the capacity of the channel and maintain the local habitat (Rutherford et al. 2002 in CRH 2007). It is important to determine after changing the orientation of a LWM structure whether or not the structure will require anchoring, which should be done by estimating the net buoyancy force and drag force on the LWM (Shields et.al. 2004 in CRH 2007).

LWM can be anchored to the stream channel or bed by one of four basic techniques (Saldi-Caromile et al. 2004; Washington State Aquatic Habitat Guidelines Program 2003): (1) No anchors - existing and newly recruited wood is mobile and finds stable locations based on stream characteristics; (2) Passive - the weight and shape of the LWM structure provides resistance to downstream transport; (3) Flexible - LWM is tethered in by at least one point into the bank or bed, but allowed to float and rotate during high flows; (4) Rigid - LWM is tethered by two or more connection points to anchors such as standing trees, duckbill or deadman anchors or keyed into a bank and not allowed to move (CRH 2007). Not anchoring any existing or newly recruited LWM, but rather allowing LWM to find stable locations based on the stream characteristics, provides the greatest benefits to stream function (CRH 2007).

For this LWMMP, the LWM will be placed in the functional inundated floodplain, or deposited directly within the low flow channel, as access allows. The low flow channel is defined by the edge of the wetted channel top width which is generally occurs at about a 880 cfs baseflow. The upper extent of the frequently inundated floodplain is defined by 5,000 cfs. Because high flows have been reported to import LWM into the channel and recruit it downstream (Keller and Swanson 1979 in CRH 2007), it is anticipated that for this LWMMP, placement of LWM within the functional inundated floodplain will result in the transport and distribution of LWM to downstream reaches in the lower Yuba River and the creation of new habitat for aquatic species downstream.

2.4.2 Placement Equipment

Sites for stockpiling of LWM along the lower Yuba River need to provide sufficient space for operation of equipment used to transport LWM to and from the site. Equipment used to place individual LWM elements and/or complexes includes an excavator with a hydraulic thumb and/or a track log loader (Saldi-Caromile et al. 2004). A "spyder" excavator (**Figure 5**) is preferred because it is relatively low-impact, requires minimal disruption of the surrounding environment to maneuver, can operate on steep slopes, and can work in water up to 1.7 m depth. However, "spyder" excavators are relatively slow which can be a time/cost issue if they are used to transport materials very far. Dual fuel tanks allow the excavator to work for 4 days between refueling, which is important when working on remote, steep or environmentally sensitive sites. The telescopic extending boom provides long reach which reduces the number of times

Figure 5. "Spyder" excavator (Source: ArcRidge LTD Environmentally Responsible Forest Services 2011).

the machine must move thereby reducing ground disturbance. Panolin biodegradable hydraulic fluid is used to protect the environment in the event of a hose failure (ArcRidge LTD Environmentally Responsible Forest Services 2011). A loader, however, does not have the ability to dig or move rocks if required. Regardless of the specific equipment used, heavy machinery that is operated in the floodplain of the lower Yuba River will use biodegradable hydraulic fluid and will be steam cleaned of residual hydraulic fluid and oil prior to operating.

2.5 Timing and Frequency

Natural LWM recruitment is generally considered to be episodic due to variable frequency and magnitude of storm events which may result in few LWM pieces entering New Bullards Bar Reservoir in some years and large amounts of LWM entering in other years. Therefore, LWM collection and downstream placement activities are anticipated to be variable in the frequency of activity in response to the episodic nature of LWM recruitment. The long-term frequency of LWM collection in New Bullards Bar Reservoir, stockpiling and placement along the lower Yuba River will be informed by the results of the previously described CESU woody material investigations, particularly the large woody material adaptive management plan.

Collection will generally occur during early summer months (e.g., June and July) following the spring snow melt and rain events when LWM is most likely to be mobilized from the North Yuba River Basin, and transported to New Bullards Bar Reservoir. It is further anticipated that stockpiling along the reservoir will continue through the summer, and LWM will be transported to the lower Yuba River during fall. Stockpiling at the enhancement sites in the lower Yuba River will occur when river stage is low to ensure placement of LWM is within the boundaries of the active floodplain. The Corps will conduct the initial collection, transporting, and placement of LWM within one year upon acceptance of this LWMMP, pending funding and fulfillment of all regulatory compliance requirements.

Prior to implementation of the LWMMP Pilot Program (see Section 4.0, below), it is anticipated that the Corps would need to comply with applicable environmental and regulatory requirements such as National Environmental Policy Act (NEPA) and the Clean Water Act (CWA). As part of compliance with the CWA, it is anticipated that the Corps will coordinate with the Regional Water Quality Control Board. As part of the NEPA process, it is also anticipated that the Corps would coordinate with NMFS, as well as USFWS and CDFG regarding potential effects to botanical and terrestrial species that may be present in areas selected for LWM stockpiling and placement along the lower Yuba River.

3.0 Recreation and Public Safety Considerations

Safety issues for recreational use and public safety on New Bullards Bar Reservoir and on the lower Yuba River are important considerations in this LWMMP. Floating debris or LWM located near the water surface of New Bullards Bar Reservoir represents a hazard to other forms of water-based recreation such as water skiing and tubing. While associated with boating, these activities require participants to be outside of the boat. Participants travel at relatively high speeds without anything to protect them should an impact with any object occur. Generally, these activities are conducted away from areas with potential hazards; however, due to the transient nature of floating debris, hazards could be present in areas where they had previously been absent. It is important to note that potential boating hazards, including debris, exist in all waterways. It is impossible to identify or remove all potential boating hazards. However, removal of LWM from New Bullards Bar Reservoir is anticipated to reduce public risk posed by floating material.

Structures that protrude into a river channel, block the channel, or are designed to trap floating materials can be hazardous to recreational users and boaters (Saldi-Caromile et al. 2004). For this LWMMP, LWM will be placed along the shoreline of the frequently inundated channel and not transversing a significant portion of the cross-sectional length of the channel at any location, to minimize impediments to flow or navigation. Some concerns regarding LWM structures stem from the fact that materials used in anchoring often persist long beyond the functional life of the structure. Cables can pose significant public safety concerns as they can form traps for recreational users, and often have sharp ends (Saldi-Caromile et al. 2004). Thus, this threat will be avoided by placing LWM without the use of cables or anchoring structures. Potential safety hazards may be reduced by placing warning signs at public access points and upstream from the LWM placement reach to alert the public.

4.0 LWMMP Pilot Program

Upon acceptance of this LWMMP, the Corps in consultation with NMFS and CDFG will conduct field reconnaissance investigations of road access, site stockpiling and LWM placement locations for the LWMMP Pilot Program. For the Pilot Program, the Corps will use LWM available from the stockpiles located along New Bullards Bar Reservoir, which is anticipated to be dominated by coniferous species. However, the long-term LWMMP will consider augmentation of LWM from New Bullards Bar Reservoir with LWM from orchard trees, if a suitable source and quantity can be identified. According to SAFCA et al. (2011), trees appropriate for use as imported LWM include orchard trees being removed for urban development or agricultural conversion, native and non-native trees designated to be removed at project sites, and other native and non-native trees designated for removal from unrelated projects. Preferred species of trees to use as LWM include

almond (*Prunus dulcis*), because of the hardness, flexibility of limbs, durability of branches, and their resistance to decay. If almond trees are not available, other dense hardwood trees such as walnut (*Juglans regia*), pistachio (*Pistacia vera*), orange (*Citrus sp.*), lemon (*Citrus sp.*), olive trees (*Olea europaea*), and durable ornamental species such as redwood, cedar, other resinous trees can be used. Trees such as eucalyptus, pine species and trees of the pome fruit family (e.g., cherry, apricot, pear and apple) should be avoided (SAFCA et al. 2011).

For the LWMPP Pilot Program, wood will be placed in either LWM complexes, defined as being comprised of 10 or more pieces of LWM, or as individual pieces. The specific quantity and arrangement of LWM placement during the LWMPP Pilot Program will be determined through site-specific accessibility, and through Corps consultation with NMFS and CDFG. Preliminary considerations regarding the quantity of LWM included in the LWMMP Pilot Program include log truck capacity, end dump truck capacity, distance from New Bullards Bar Reservoir to sites identified along the lower Yuba River, individual LWM pieces or pieces with rootwads and multiple branches. These considerations indicate that, depending on the nature and availability of the LWM, quantities of LWM for the LWMMP Pilot Program could range from approximately 500 – 1,000 logs (1-2 ft in diameter) and from 1,000 – 3,000 yd^3 of rootwad material.

The Corps will take advantage of studies currently being undertaken by YCWA as part of the FERC Relicensing study plan process and by the Yuba Accord RMT to establish a baseline of LWM presence, location and abundance in the lower Yuba River. Field mapping efforts of LWM in select locations within the lower Yuba River was performed by the RMT, but the extensive amount of material present made the ground surveys unrealistically time consuming. RMT field methods were revised to largely substitute aerial photograph analyses.

Aerial photography and other remote sensing techniques can be used to obtain inventory data and can be valuable tools for making management decisions (USDOI 2001). Aerial photos have proven especially useful in the management of riparian-wetland areas. Aerial photography can also assist in assessing functionality, determining classification, and improving management planning processes. Aerial photos also link data geographically, allowing detailed vegetation maps to be transferred to a Geographic Information System (GIS) for spatial modeling purposes (USDOI 2001). Aerial photo baseline data, when carefully selected prior to a project, allows analysis of a large area of interest, at a minimum cost, in less time per hectare than conventional on-the-ground methods (Keating 1993 in USDOI 2001). Certainly tree canopy, herbaceous cover, and to some extent, age distribution of woody dominant species can also be identified using aerial photos at an adequate scale.

As part of the YCWA FERC Relicensing process and the RMT process, an analysis of historic aerial photographs and maps of the lower Yuba River dating from 1906 through 1998 will be undertaken as a joint project between YCWA and the RMT. This effort is anticipated to be completed prior to summer 2012. In addition, YCWA will conduct field measurement of LWM along study sites in the lower Yuba River during spring/summer of 2012. According to YCWA, LWM occurring within study sites will be counted as follows: all LWM greater than 3 ft in length within the active channel within four diameter classes (4-12 in, 12-24 in, 24-36 in, and greater than 36 in) and four length classes (3-25 ft, 25-50 ft, 50-75 ft, and greater than 75 ft).

More detailed measurements will be taken for key pieces located within riparian habitat study sites. Key pieces of LWM are defined as pieces either longer than 1/2 times the bankfull width, or of sufficient size and/or are deposited in a manner that alters channel morphology and aquatic habitat (e.g., trapping sediment or altering flow patterns). Key piece characteristics to be recorded will include:

- Piece location, either mapped onto aerial photos or documented with GPS
- Piece length
- Piece diameter
- Piece orientation
- Position relative to the channel
- Whether the piece has a rootwad
- Tree species or type (e.g., conifer or hardwood)
- Whether the LWM piece is associated with a jam or not (number of LWM pieces in the jam) recruitment source and mechanism function in the channel

These same key piece characteristics will be recorded for all LWM placed in the lower Yuba River as part of the LWMMP Pilot Program, in addition to photographs taken of all placed LWM. In addition to key pieces, measurements will be taken and data recorded for all LWM greater than 3 ft in length within the active channel within four diameter classes (4-12 in, 12-24 in, 24-36 in, and greater than 36 in) and four length classes (3-25 ft, 25-50 ft, 50-75 ft, and greater than 75 ft).

Because fish habitat creation is usually identified as one of the primary goals of an in-stream project utilizing LWM, project monitoring generally focuses on the physical expressions of this goal (Larson et al. 2001). However, structural habitat may be only one of numerous conditions that are a limiting factor for fish survival, as well as survival of other aquatic species (such as benthic invertebrates) that are critical links in the aquatic food web (Larson et al. 2001). Studies have shown that macroinvertebrate community structure changes and diversity increases when structures are added (Hilderbrand et al. 1997; Gortz 1998).

Effectiveness monitoring of LWM placed in the lower Yuba River is anticipated to be conducted by using: (1) aerial photography to visually detect wood movement into downstream reaches; and (2) field-based reconnaissance/verification using GPS tracking to detect and record wood movement.

The resultant effects of the Corps' LWMMP Pilot Program will be evaluated to assess the effectiveness of LWM placement in the lower Yuba River, including whether LWM placement at the locations selected has resulted in improved habitat conditions for anadromous salmonids. It is anticipated that a performance evaluation will be conducted, which will use the performance criteria described below. Performance evaluation considerations will include the size and quantities of LWM collected from New Bullards Bar Reservoir, and the spatial and temporal distribution of

LWM in the lower Yuba River. Components of the performance evaluation to be conducted include the following.

- Estimate the quantity of LWM collected that met the size, type, and density suitability criteria
- Evaluate the spatial and temporal distribution of LWM in the placement reaches and the downstream reaches of the lower Yuba River
- Estimate the proportion of LWM contributed to the lower Yuba River by introduction, relative to LWM contributed to the lower Yuba River by natural recruitment
- Evaluate the physical, geomorphic characteristics where LWM was deposited (e.g., landform, water velocity, geomorphologic unit)
- Characterize the extent and substrate size of spawning gravel recruitment in areas directly downstream of LWM
- Assess the potential for public safety to be affected given the distribution of LWM in the placement reaches and in the downstream reaches of the lower Yuba River

The effectiveness monitoring is anticipated to be conducted during the first low flow period (i.e., fall) occurring after initial placement of the LWM as part of the LWMMP Pilot Program. Thus: (1) baseline monitoring will be complete by end of September 2012; (2) initial LWM placement under the Pilot Program will occur during September 2012; and (3) Pilot Program monitoring will be conducted during September 2013. During winter 2012/2013, the Corps will prepare an interim report describing the results of the monitoring and analyses conducted as part of the LWMMP Pilot Program performance evaluation. The interim report will include:

- Summary description of the existing LWMMP, and proposed plan modifications (if any)
- Summary of efforts completed in the previous year relating to the plan requirements, including a tally of the LWM collected from the stockpiles along the shoreline of New Bullards Bar Reservoir and transported to the lower Yuba River
- Inventory of the number and size of LWM along the lower Yuba River
- Information regarding: (1) the sizes, types and locations of LWM mobilized during higher flow conditions; and (2) LWM movement patterns in the lower Yuba River, as observed via aerial photography and field reconnaissance efforts
- Description of any problems encountered and associated remedies

The interim report also may identify provisions addressing future LWM needs and the frequency of subsequent LWM reintroductions into the lower Yuba River, as well as recommended considerations for the integration of the LWMMP with other future or ongoing plans (e.g., Riparian Restoration Plan).

The Corps will submit a copy of the interim report to NMFS and CDFG for review, comment and identification of other potential LWMMP recommendations. During the performance evaluation, lower Yuba River site conditions or study findings also may warrant modifications to the approach that will be used in the long-term LWMMP, which will be described in the report.

If necessary, following completion of the performance evaluation and report review by NMFS and CDFG, recommended modifications to the LWMMP would be considered and incorporated into the Long-term Adaptive Monitoring and Evaluation Plan. LWM placement under the long-term LWMMP is anticipated to occur during September 2014.

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APPENDIX B

Section 404(b)(1) Analysis

Section 404(b) (1) Evaluation

Lower Yuba River Large Woody Material Management Plan Pilot Study, 2012-2013
Yuba County, California

I. Project Description

The U.S. Army Corps of Engineers (Corps) is proposing to implement a Large Woody Material Management Plan Pilot Study (Pilot Study). In order to comply with National Marine Fisheries Service (NMFS) issued a long-term biological opinion (BO) the Corps will introduce 500 pieces of woody material ranging from 30-90 centimeter (cm) in diameter and a minimum of 730 cm long placed in 2012 and in 2013. The Pilot Study is a component of the *Lower Yuba River Large Woody Material Management Plan* (Management Plan), which was a requirement of the BO's incidental take statement.

a. Location

The Preferred Alternative site is located in along the lower Yuba River in Yuba County, California (Plate 1), approximately 20 miles east from the City of Marysville (Plate 2). Several potential placement sites have been located along an approximately four-mile reach of the lower Yuba River downstream of the Highways 20 Bridge (Plate 3). In addition, the Pilot Program may consider launching LWM from the base of Englebright Dam. Placement sites and means will be finalized based on further site assessments, the nature of the existing large woody material (LWM) stockpiles, and consultation with resource agencies. LWM will be procured from existing stockpiles at New Bullards Dam and Reservoir, which is located approximately 30 miles northeast of the Highway 20 Bridge.

b. General Description

LWM for the proposed Pilot Study will be procured from existing stockpiles at New Bullards Dam and Reservoir. A cable-an-buoy line (floating boom) spans the reservoir just upstream of the dam. The floating boom captures woody material that has entered and traveled downstream on the reservoir's surface. Yuba County Water Agency (YCWA) manages the LWM that is washed into the New Bullards Bar Reservoir from the upstream watershed. Tug boats are used to push LWM into shallow coves that have landside access and the pieces are subsequently stockpiled on the shoreline using a boom. The Corps will coordinate with YCWA to gather LWM from these stockpiles for transport and placement in the Pilot Study study area. If the amount and size of LWM from the New Bullards stockpiles are insufficient to meet the meet the needs of the Pilot Study, then orchard trees from existing other stockpiles may be used to the extent allowed by the BO.

Placement sites and means for the Pilot Study will be finalized based on further site assessments, the nature of existing stockpiles, and consultation with resource agencies. The placement sites identified in the Management Plan are approximate locations. The exact placement and configuration of LWMs will depend on site conditions (including access) and

source materials. The Management Plan calls for LWM to be placed in the functional inundated floodplain, or deposited directly within the low flow channel, as access allows.

For the Pilot Study, sites within the study area must be legally and physically accessible by required equipment. Placement of LWM will occur when the river stage is low to ensure placement within the boundaries of the active floodplain but not directly in the low stage water. Placement will not require the removal of existing vegetation or in-water excavation. It is anticipated that placement of LWM within the functional floodplain will result in the natural transport and distribution of the material to lower reaches of the river during higher stage flows. An annual monitoring program will assess the effectiveness of LWM placement and guide subsequent placements under the Pilot Study and the development of the long term Management Plan.

c. Background

On November 21, 2007, National Marine Fisheries Service (NMFS) issued a long-term biological opinion (BO) regarding the U.S. Army Corps of Engineers' (Corps) operation and maintenance of Daguerre Point and Englebright dams (NMFS, 2007). On December 20, 2011, the U.S. District Court, ordered NMFS to file a new BO by February 29, 2012. The new BO, dated February 29, 2012, included an incidental take statement (ITS) with several terms and conditions. Term and Condition D3 of the BO requires the Corps to "develop and implement a long term program to replenish instream woody material" (NMFS, 2012). In anticipation of this Term and Condition D3, the Corps has prepared the *Lower Yuba River Large Woody Material Management Plan* Management Plan), which includes the implementation of a Pilot Study starting in 2012 in order to enhance rearing conditions for spring-run Chinook and Central Valley steelhead (Corps, 2012).

d. Authority and Purpose

Harry L. Englebright Dam and Lake were authorized by the River and Harbor Act of 1935 (49 Stat. 1028) as a unit of the Sacramento River Debris Control Project. Construction of recreation facilities at Englebright Lake and provision of services to the public by concessionaire is in accordance with Section 4 of the Flood Control Act of 1944 (58 Stat. 887) and subsequent amendments

Instream LWM provides escape cover and relief from high current velocities for juvenile salmonids and other fishes. Although there is not a current consensus on the amount of large wood pieces found along the reach of the lower Yuba River extending south of Highway 20 bridge to Hammon Bar, the proposed Pilot Study will place and monitor quantities of LWM, as required by the 2012 BO, to improve juvenile salmonid rearing habit in the lower Yuba River.

e. General Description and Quantity of Woody Material

(1) General Characteristics of Material. In accordance with the BO, a minimum of 500 pieces of 30-60 centimeter (cm) in diameter and a minimum of 730 cm long, and 30 pieces 60-

90 cm in diameter and at least 730 cm long, and 10 pieces greater than 90 cm in diameter and 730 cm long shall be placed in 2012 and in 2013. Of this annual number, 10 percent of the pieces shall have attached rootwads, and not more than 20 percent of the pieces can be orchard tree species.

(2) Source of Material. LWM for the proposed Pilot Study will be procured from existing stockpiles at New Bullards Dam and Reservoir. If the amount and size of LWM from the New Bullards stockpiles are insufficient to meet the needs of the Pilot Study, then orchard trees from existing stockpiles elsewhere may be used to the extent allowed by the BO.

f. Description of the Proposed Project Site(s)

(1) Location. The proposed project sites are located in along the lower Yuba River in Yuba County, California, approximately 20 miles from the City of Marysville (Plate 1). Several potential placement sites have been located along an approximately four-mile reach of the lower Yuba River downstream of the Highways 20 Bridge from Parks Bar to Hammon Bar (Refer to Figure 1).

(2) Size. The combined size of the potential placement sites would be less than 1 acre.

(3) Type of Site. The woody material will be placed within the functional floodplain outside of the low stage river channel. The potential placement areas are elevated rock cobble benches.

(4) Type(s) of Habitat. The proposed placement sites are largely devoid of vegetation of vegetative habitat. Small isolated clumps of shining willow, mulefat, and other riparian species are scattered along the otherwise barren rock cobble benches.

(5) Timing and Duration of Discharge. The proposed work would be conducted over two to six weeks in the late summer or Fall pursuant to coordination with NMFS and FWS.

g. Description of Installation Method

Equipment used to place individual LWM elements and/or complexes includes an excavator with a hydraulic thumb and/or a track log loader. A small excavator is preferred since it has relatively low-impact with minimal disruption of the surrounding environment. A telescopic extending boom provides long reach which reduces the number of times the machine must move, which reduces ground disturbance.

II. Factual Determinations (Section 230.11)

a. Physical Substrate Determinations (consider items in Section 230.11(a# and 230.20 Substrate)

(1) Substrate Elevation and Slope. The project site is approximately 225 feet above sea level with a channel slope of 14 to 15 feet per mile.

(2) Sediment Type. Soils of the site are river deposits which include silts, sands, gravel, and bedrock.

(3) Material Movement. The project site is within a hydraulically efficient stretch of lower Yuba River. Some of the material will likely be flushed from the placement area into the system during high flows. The Pilot Study includes a monitoring program to track material movement.

(4) Physical Effects on Benthos (burial, changes in sediment type, etc.). The same or higher invertebrate density and biomass are expected after the proposed LWM installation as compared to the existing site conditions. These benefits may only be temporary because of the transient nature LWM within the hydraulically efficient stream channel.

(5) Other Effects. The project may increase the amount of suspended sediment and thus turbidity within the project area if LWM is placed directly within the low flow channel. However, the increase would be temporary and localized during the placement of the LWM.

(6) Actions Taken to Minimize Impacts. As specified in the project description, LWM would be washed if necessary to meet cleanliness values required under the Clean Water Act. Placing materials within the functional floodplain and not directly in the low stage water channel will minimize impacts to water quality.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Consider effects on:

(a) *Salinity*. Not applicable.

(b) *Water Chemistry (pH, etc.)*. No significant effect.

(c) *Clarity*. Temporary and localized increases in turbidity may occur if LWM is placed directly within the low flow channel at the placement sites and immediately downstream. No significant long-term effects.

(d) *Color*. Temporary and localized changes in color may occur at the installation sites and immediately downstream. No significant long-term effects.

(e) *Odor*. No significant effect.

(f) *Taste*. No significant effect.

(g) *Dissolved Gas Level*. No significant effect.

(h) *Nutrients*. No significant effect.

(i) *Eutrophication*. No significant effect.

(j) *Others as Appropriate*. No significant effect.

(2) Current Patterns and Circulation. No significant effect.

(3) Normal Water level Fluctuations. No significant effect.

(4) Salinity Gradients. Not applicable

(5) Actions That Will Be Taken to Minimize Impacts. As specified in the project description, LWM will be washed if necessary to meet cleanliness values required under the Clean Water Act. Placing materials within the functional floodplain and not directly in the low stage water channel will minimize impacts to water quality.

c. Suspended Particulate/ Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Installation Sites. Short-term increases in turbidity would be localized where material is placed into the lower Yuba River channel.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column.

(a) *Light Penetration*. No significant effect.

(b) *Dissolved Oxygen*. No significant effect.

(c) *Toxic Metals and Organics*. If determined necessary, LWM will arrive pre-washed from a supply sources to remove sediments that may contain mercury. Any mercury levels remaining in residual sediments would be considered low and its release would not be expected to pose any environmental or health risk

(d) *Pathogens*. Not applicable.

(e) *Esthetics*. Turbidity would be localized and temporary. No significant change is anticipated.

(f) *Others as Appropriate*. There would be no other significant adverse effects to the chemical and physical properties of the water column.

(3) Effects on Biota

(a) *Primary Production, Photosynthesis*. LWM installation activities would result in localized and temporary increases in turbidity. Increases in turbidity would be minimal and would not inhibit photosynthesis in the channel.

(b) *Suspension/ Filter Feeders*. The project may temporarily affect suspension and filter feeders on a localized scale. However, the effect would be temporary and less than significant for the area.

(c) *Sight Feeders*. The project would temporarily affect sight feeders on a localized scale. However, the effect would be temporary and less than significant for the area.

(4) Actions Taken to Minimize Impacts. None required.

d. Contaminant Determinations

The proposed project would not add contaminants to any nearby body of water. Best management practices to reduce the potential of accidental spills during LWM installation would follow all regulatory requirements in conjunction with the National Pollution Discharge Elimination System permitting process.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton. Effects to plankton would be temporary and not significant. No additional measures to minimize effects are needed for placement of LWM at project sites.

(2) Effects on Benthos. Effects to the benthos would be temporary and not significant. No additional measures to minimize effects are needed placement of LWM at project sites.

(3) Effects on Nekton. Effects to nekton would be temporary and not significant. No additional measures to minimize effects are needed for placement of LWM at project sites.

(4) Effects on aquatic Food Web. There would be no adverse effects to the aquatic food web, or the plankton, benthic and nekton communities with the proposed project footprint.

(5) Effects on Special Aquatic Sites (discuss only those found in project area or disposal site)

(a) *Sanctuaries and Refuges*. None exist in project area.

(b) *Wetlands*. None exist in project area.

(c) *Mud Flats*. None exist in project area.

(d) *Vegetated Shallows*. None exist in project area.

(e) *Coral Reefs*. None exist in project area.

(f) *Riffle and Pool Complexes*. Effects would be localized and temporary. No significant change is anticipated.

(6) Threatened and Endangered Species.

Implementation of the Pilot Study will satisfy the Terms and Conditions of the incidental take statement included in the BO dated November 21, 2007. It would have a beneficial effect on the listed Central Valley spring-run Chinook salmon and Central Valley steelhead. It would not destroy or adversely modify the designated critical habitat for these species.

(7) Other Wildlife. The proposed Pilot Study would not result in adverse effects on the environmental resources in the project area, including threatened and endangered species, and other wildlife and vegetation due to the limited scope the proposed action.

(8) Actions to Minimize Impacts. There would be no significant adverse effects to wildlife due to proposed project action. Therefore, there would be no minimization measures needed.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination. Not applicable.

(2) Determination of Compliance with Applicable Water Quality Standards. No water quality or effluent standards would be violated during proposed action.

(3) Potential Effects on Human Use Characteristics. The proposed project would not have any effects to municipal and private water supply, recreational and commercial fisheries, or water-related recreation. There would be no national and historic monuments, parks, seashores, wilderness areas, research sites or similar preserves affected by the proposed project.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

Currently, there are multiple planned and ongoing resource restoration projects within the Yuba River watershed with the goal of increasing and stabilizing anadromous fish populations. These projects include improved sediment management, fish screening alternatives at diversions, habitat improvement and restoration, and improved fish passage. The California Department of Water Resources, the Lower Yuba River Technical Working Group, and the Lower Yuba River Accord River Management Team are all also supporting development of long-term restoration planning to assist in prioritizing actions to complete restoration and enhancement of salmonid habitat. The proposed action, in combination with past, present, and potential future restoration actions on the lower Yuba River, would contribute to the overall health and vigor of the watershed.

h. Determination of Secondary Effects on the Aquatic Ecosystem

Local physical habitat changes, such as improved escape cover and relief from high velocities are to be expected. Behavioral and biological benefits for salmonids can also be expected downstream of the proposed LWM installation sites, including reduced predatory losses, increased rearing habitat, and improved invertebrate production.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

a. Adaptation of the Section 404(b)(1) Guidelines to this Evaluation

No significant adaptations of the guidelines were made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Impact on the Aquatic Ecosystem

There were no alternatives identified that would have significantly less adverse effects on the aquatic ecosystem than the proposed alternative.

c. Compliance with Applicable State Water Quality Standards, and;
d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act

The proposed project would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

e. Compliance with Endangered Species Act (ESA) of 1973

Implementation of the Pilot Study will satisfy the Terms and Conditions of the incidental take statement included in the BO dated November 21, 2007.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972

Not applicable.

g. Evaluation of Extent of Degradation of the Waters of the United States

(1) Significant Adverse Effects on Human Health and Welfare

a. *Municipal and Private Water Supplies*. None.
b. *Recreation and Commercial Fisheries*. None.
c. *Plankton*. None.
d. *Fish*. None.
e. *Shellfish*. None.
f. *Wildlife*. None.
g. *Special Aquatic Sites*. None.

(2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems. None.

(3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity, and Stability. None.

(4) Significant Adverse Effects on Recreational, Esthetic, and Economic Values. None.

APPENDIX C

401 Certification

Linda S. Adams
Secretary for
Environmental Protection

State Water Resources Control Board

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5455
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
FAX (916) 341-5463 • Internet Address: http://www.swrcb.ca.gov

erry ro n
Governor

NOTICE OF INTENT
TO COMPLY WITH THE TERMS OF
GENERAL WATER QUALITY CERTIFICATION ORDER FOR SMALL HABITAT RESTORATION PROJECTS

I. NOTICE OF INTENT STATUS (see instructions)

MARK ONLY ONE ITEM	A. ☑ New Applicator	B. ☐ Change of Information for WDID#

II. Owner of Land/Billing Address

A. Name			
United States Army Corps of Engineers, Sacramento District			
B. Mailing Address			
1325 J Street			
C. City	D. County	E. State	F. Zip
Sacramento	Sacramento	CA	95630
G. Contact Person	H. Title	I. Phone	
Brad Johnson	Landscape Architect	916-557-7812	

III. Discharger (if different from owner of the land)

A. Name			
See Above			
B. Mailing Address			
C. City	D. County	E. State	F. Zip
G. Contact Person	H. Title	I. Phone	

STATE USE ONLY

WDID:	Regional Board Office:	Date NOI Received:
		Check #:

IV. Site Location

A. Address Yuba River Between Highway 20 Bridge and Hammon Bar (Refer to attached maps)		
B. Nearest Cross Street(s) Highway 20 Bridge		
C. County: Yuba	D. Total size of Site (acres): <1 Acre	E. Assessor's Parcel Number: N/A Waters of the United States

Latitude/longitude (Center of Discharge Area) in degrees/minutes/seconds (DMS) to the nearest ½ second or decimal degrees (DD) to four decimals (0.0001 degree)

DMS: N. Latitude Deg._____Min._____Sec._____
W. Longitude Deg._____Min._____Sec._____

DD: N. Latitude 39°13'14.82"N (HWY 20 Bridge) 39°13'25.93" (N Hammon Bar)
W. Longitude 121°20'10.20"W (HWY 20 Bridge) 121°24'7.54" (W Hammon Bar)

Attach a map of at least 1:24000 (1" = 2000') detail of the proposed discharge site (e.g., USGS 7.5 minute topographic map) and pre-project photos.

F. GPS readings(s)
N/A

V. Discharge Information

Subject	Notes
A. Name(s) and type(s) of receiving waters: Lower Yuba River	Receiving water types are: river/streambed, lake/reservoir, ocean/estuary/bay, riparian area, wetland
B. Eligibility of receiving water. Provide evidence that the water affected by this discharge is deemed to be outside of federal jurisdiction: Waters of the United States	U.S. Army Corps of Engineers jurisdictional disclaimer letter, or explanation why such a disclaimer is not needed.
C. Identify all regulatory agencies having jurisdiction over this project. Attach copies of all federal and State license/permit applications or issued copies of licenses/permits from government agencies: United States Army Corps of Engineers, United States Fish and Wildlife Service, National Marine Fisheries Service	For example: Dept. of Fish and Game Streambed Alteration Agreement, Coastal Commission permit.

D. Proposed project start date: October 01, 2012	E. Expected date of completion: October 31, 2013

VI. Project Information

A. Project description: The U.S. Army Corps of Engineers (Corps) is proposing to implement a Large Woody Material Management Plan Pilot Study in order to comply with a 2012 National Marine Fisheries Service (NMFS) biological opinion (BO) related to the operation of Englebright Dam. Placement of large woody material is scheduled for fall of 2012 and 2013.	For example: Discharge of gravel; discharge of fill; placement of woody debris
B. Purpose of the entire activity: The proposed Pilot will place and monitor quantities of large woody material to improve juvenile salmonid rearing habit in the lower Yuba River.	For example: Wetland restoration; stream bank re-vegetation; stream bank stabilization
C. Characterization of discharges: Clean woody material	What types of constituents will be discharged?

Fill and Excavation Discharges: For each water body type listed below, indicate IN LINEAR FEET the area of the proposed discharge to waters of the state, and identify the impacts(s) as permanent and /or temporary. For linear discharges to drainage features and shorelines, e.g., bank stabilization, stream channel enhancement, and wetland/stream restoration projects also specify the length of the proposed discharge to waters of the state AS FEET.

Water Body Type	Temporary Impact	
	Acres	Linear Feet
Wetland		
Riparian		
Stream bed/Stream bank	1 acre	21000
Lake/Reservoir		
Ocean/Estuary/Bay		

Dredging Discharges: Volume (cubic yards) of dredged material to be discharged into waters of the United States.
n/a

VII. CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. Additionally, I certify that the provisions of the permit, including developing and implementing a monitoring program, will be complied with."

Printed Name: _____

Signature: _____ **Date:** _____

Title: _____

APPENDIX D

Special State Species Lists and Coordination

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
08ESMF00-2012-CPA-0108

MAY 31 2012

Alicia Kirchner
Chief, Planning Division
Corps of Engineers, Sacramento District
1325 J Street
Sacramento, California 95814

Dear Ms. Kirchner:

This letter constitutes the U.S. Fish and Wildlife Service's (Service) Fish and Wildlife Coordination Act Report regarding the U.S. Army Corps of Engineers (Corps) proposed Lower Yuba River Large Woody Material Management Plan Pilot Program (project), Yuba County, California. The information considered by the Service was obtained from a draft of the Corp's Lower Yuba River Large Woody Material Management Plan (LWMMP); a February 29, 2012, biological opinion (BO) drafted under Section 7 of the Endangered Species Act by the National Marine Fisheries Service (NMFS); a site visit to the lower Yuba River project area on May 10, 2012; information compiled from the Yuba River Fisheries Technical Working Group; and other information available to the Service.

In October, 2011, the Corps submitted a biological assessment to NMFS outlining a conservation measure with the intent to develop and implement a long-term program to replenish large woody material in the lower Yuba River. As part of this LWMMP, the Corps has proposed to conduct a pilot program to identify suitable locations and evaluate the efficacy of placing large in-stream woody material to modify local flow dynamics to increase cover and diversity of instream habitat for the primary purpose of benefitting juvenile salmonid rearing. Furthermore, based upon the outcomes of the pilot program, the Corps will develop and implement the long-term LWMMP for the lower Yuba River. These conservation measures are part of the terms and conditions of the February 29, 2012, BO issued by NMFS.

The purpose of the project is to provide a pilot study as part of the lower Yuba River LWMMP. For the project, placement of large woody materials will occur when the river stage is low to ensure placement within the boundaries of the active floodplain. Placement will not require the removal of existing vegetation or in-water excavation. It is anticipated that placement of large woody material within the functional inundated floodplain will result in the natural transport and distribution of the material to lower reaches of the river. An annual monitoring program integrated with the existing gravel monitoring program will assess the effectiveness of large woody material placement and guide subsequent placements under the project and the development of the long-term program.

The exact placement and configuration of large woody materials will depend on site conditions (including access) and source materials. The large woody material will be placed in the functional inundated floodplain, or deposited directly within the low flow channel, as access allows. Material for the LWMMP Pilot Program could range from 500 – 1,000 logs (1-2 feet in diameter), and 1,000 – 3,000 cubic yards of rootwad material.

Material for the proposed Pilot Program will be procured from existing stockpiles at New Bullards Dam and Reservoir. A floating boom line captures woody material that has entered and traveled downstream on the reservoir's surface. Yuba County Water Agency (YCWA) stockpiles the large woody material that is washed into the New Bullards Bar Reservoir from the upstream watershed. The Corps will coordinate with YCWA to gather large woody material from these stockpiles for transport and placement in the Pilot Program study area. If the amount and size of large woody material from the New Bullards stockpiles are insufficient to meet the needs of the Pilot Program, then orchard trees from existing stockpiles may be used to the extent allowed by the BO.

All equipment will be staged in previously disturbed areas outside of the floodplain. Materials will be transported to downstream placement sites via log trucks or dump trucks utilizing existing roads and access sites. Upon completion of large woody material placement, all sites will be returned to pre-construction conditions. The proposed work would be conducted annually during over a period of 2-6 weeks in the late summer or early Fall, once sufficient stockpiles have been collected. Work hours would be limited to normal workdays, from 8:00 a.m. to 5:00 p.m.

A main goal of the pilot program is to identify and monitor suitable potential placement sites for large woody material downstream of Englebright Dam and upstream of Daguerre Point Dam. Suitable sites should provide cover to juvenile salmonids, which may be present at all times of the year. However, large woody material placements should not provide cover for predatory fish, such as the Sacramento pikeminnow. Pikeminnow generally are piscivorous when their body length exceeds 250 millimeters. Instream flow studies conducted by the Service have found that pikeminnow of such size are usually found in water depths of at least 2.3 feet, yet juvenile salmonids will use more shallow waters.

Large woody material placement sites also can provide microsites suitable for the establishment of riparian vegetation, such as cottonwoods and willows. Such vegetation is also beneficial to salmonids as it can provide shaded riverine aquatic habitat. For the LWMMP Pilot Program, post-placement monitoring should record the effectiveness of the material in establishing riparian vegetation.

Since the project is a pilot program, deciduous (hardwood) materials with rootwads are preferable because the likelihood that such pieces would remain in place for several years is relatively higher than for conifers. Coniferous woody material has less mass and decays faster than hardwoods. A benefit of using coniferous material is that it will more quickly add detritus to the microsite ecosystem, which may aid in establishing stable invertebrate communities. If the largest pieces of woody material at sites are coniferous, they should be anchored in place so that high-water events do not remove them from the ecosystem.

In summary, the Service supports implementation of the project, which would increase beneficial habitat for the Central Valley spring-run Chinook salmon and the Central Valley steelhead. The Service recommends that the Corps:

1. Use placement sites that will have swift moving water that is less than 2.3 feet in depth.
2. Avoid disturbances to existing woody vegetation.
3. Minimize changes to existing river geomorphology as much as possible.
4. Use mainly hardwoods for large woody material with no growth from the current season. Woody material with sap or leaves from the current growing season can add toxins and reduce oxygen levels at woody material microsites.
5. Evaluate the effectiveness of anchoring methods used for woody material placement. If woody material does not remain in place during the pilot program, coordinate with the resource agencies to determine a means to anchor woody material in place for subsequent replenishment efforts.
6. Provide subsequent reports and coordination with the resource agencies to ensure that future phases of the LWMMP adapt to additional information and circumstantial changes.

If you have any questions regarding this report, please contact Staff Biologist Harry Kahler at (916) 414-6612.

Sincerely,

Daniel Welsh
Assistant Field Supervisor

cc:
Douglas Edwards, COE, Sacramento, CA
Douglas Grothe, COE, Smartville, CA
NOAA Fisheries, Sacramento, CA
Regional Manager, CDFG, Region 2, Rancho Cordova, CA

Species	Common Name	Federal List	State List	CDFG	CNPS
Invertebrates					
Branchinecta conservatio	conservancy fairy shrimp	Endangered	None		
Branchinecta lynchi	vernal pool fairy shrimp	Threatened	None		
Branchinecta lynchi	Critical Habitat: vernal pool fairy shrimp	-	-		
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	Threatened	None		
Lepidurus packardi	vernal pool tadpole shrimp	Endangered	None		
Lepidurus packardi	Critical Habitat: vernal pool tadpole shrimp	-	-		
Linderiella occidentalis	California linderiella	None	None		
Fish					
Acipenser medirostris	green sturgeon	Threatened	None		
Hypomensus transpacificus	delta smelt	Threatened	Threatened		
Oncorhynchus mykiss	Central Valley steelhead	Threatened	None		
Oncorhynchus mykiss	Critical Habitat: Central Valley steelhead	-	-		
Oncorhynchus tshawytscha	chinook salmon - Central Valley spring-run ESU	Threatened	Threatened		
Oncorhynchus tshawytscha	Critical Habitat: chinook salmon - Central Valley spring-run ESU	-	-		
Oncorhynchus tshawytscha	winter-run chinook salmon, Sacramento River	Endangered	Endangered		
Amphibians					
Rana draytonii	California red-legged frog	Threatened	None		
Reptiles					
Emys marmorata	western pond turtle	None	None	SC	
Thamnophis gigas	giant garter snake	Threatened	Threatened		
Birds					
Agelaius tricolor	tricolored blackbird	None	None	SC	
Asio otus	long-eared owl	None	None	SC	
Athene cunicularia	burrowing owl	None	None	SC	
Buteo swainsoni	Swainson's hawk	None	Threatened		
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	Candidate	Endangered		
Laterallus jamaicensis coturniculus	California black rail	None	Threatened		
Mammals					
Lasiurus blossevillii	western red bat	None	None	SC	
Lasiurus cinereus	hoary bat	None	None		
Myotis yumanensis	Yuma myotis	None	None		
Plants					
Clarkia biloba ssp. brandegeeae	Brandegee's clarkia	None	None		1B.2
Downingia pusilla	dwarf downingia	None	None		2.2
Legenere limosa	legenere	None	None		1B.1

Species	Common Name	Federal List	State List	CDFG	CNPS
Habitat					
Northern Hardpan Vernal Pool	Northern Hardpan Vernal Pool	None	None		

Notes:
CDFG = California Department of Fish and Game
SC = CDFG Species of Concern designation
CNPS = California Native Plant Society
1B.1 = Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California
1B.2 = Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in California
2.2 = Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in California

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the BROWNS VALLEY (543B) U.S.G.S. 7 1/2 Minute Quad

Database last updated: September 18, 2011

Report Date: May 30, 2012

Listed Species

Invertebrates

Branchinecta conservatio
Conservancy fairy shrimp (E)

Branchinecta lynchi
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Lepidurus packardi
Critical habitat, vernal pool tadpole shrimp (X)
vernal pool tadpole shrimp (E)

Fish

Hypomesus transpacificus
delta smelt (T)

Oncorhynchus mykiss
Central Valley steelhead (T) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
Central Valley spring-run chinook salmon (T) (NMFS)
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Thamnophis gigas
giant garter snake (T)

Candidate Species

Birds

Coccyzus americanus occidentalis
Western yellow-billed cuckoo (C)

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

U.S. Fish & Wildlife Service
Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the SMARTVILLE (543A) U.S.G.S. 7 1/2 Minute Quad

Database last updated: September 18, 2011
Report Date: May 30, 2012

Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Oncorhynchus mykiss
Central Valley steelhead (T) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
Central Valley spring-run chinook salmon (T) (NMFS)
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Thamnophis gigas
giant garter snake (T)

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

APPENDIX E

Mailing List

Lower Yuba River Gravel Augmentation Project
Yuba and Nevada Counties, California

Federal Agencies

National Marine Fisheries Service
Rodney R. McInnis
Regional Administrator
650 Capitol Mall, Suite 8-300
Sacramento, CA 95814-4706

U.S. Bureau of Land Management
Bill Haigh
63 Natoma St.
Folsom, CA 95763

U.S. Geological Survey, CaliforniaWater Science Center
Charles Alpers, PhD
Placer Hall
6000 J Street
Sacramento, CA 95819-6129

USDA Forest Service
Julie Tupper
650 Capitol Mall, Room 7524
Sacramento CA 95814

USDA Forest Service
Tahoe National Forest
Walt Levings
631 Coyote St.
Nevada City CA 95959

State Agencies
Pacific Gas & Electric
Mr. Richard Moss
P.O. Box 7442
San Francisco, CA 94120-7442

California Department of Fish andGame
Julie Brown
1416 9th Street
Sacramento, CA 95814

California Department of Parks andRecreation
Syd Brown
P.O. Box 942896
Sacramento, CA 94296-0001

California Department of Parks andRecreation
Matt Green
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