Reinitiation of Formal Consultation

Biological Opinion of the Effects of Long-term Operation of the Central Valley Project and State Water Project as Modified by Implementing the Preferred Alternative in the Draft Environmental Impact Statement/Environmental Impact Report for the Trinity River Mainstem Fishery Restoration Program

Request for Consultation on the Implementation of this Alternative on the Threatened Northern Spotted Owl, Northern Spotted Owl Critical Habitat, and the Endangered Bald Eagle within the Trinity River Basin, and Where Applicable, Central Valley Reservoirs

Consultation Conducted by:
U.S. Fish and Wildlife Service,
Sacramento Fish and Wildlife Office

October 12, 2000

United States Department of the Interior

FISH AND WILDLIFE SERVICE
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IN REPLY REFER TO:
1-1-00-F-0125

October 12, 2000

Memorandum

To: Regional Director, U.S. Bureau of Reclamation, Sacramento, California

Manager, California-Nevada Operations Office, Sacramento, California

From: Field Supervisor, Sacramento Field Office, Sacramento, California

Subjects: (1) Reinitiation of Formal Consultation on the Effects of Long-term Operation of the Central Valley Project and State Water Project as Modified by Implementing the Preferred Alternative in the Draft Environmental Impact Statement/Environmental Impact Report for the Trinity River Mainstem Fishery Restoration Program. (2) Request for Consultation on the Implementation of this Alternative on the Threatened Northern Spotted Owl, Northern Spotted Owl Critical Habitat, and the Endangered Bald Eagle within the Trinity River Basin and where applicable, Central Valley reservoirs.

This responds to your request of June 6, 2000, to reinitiate formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (Act), on the effects of the long-term operation (OCAP) of the Central Valley Project (CVP) and State Water Project (SWP) as modified by implementing the preferred alternative (also referred to as the Flow Evaluation Alternative) in the Draft Environmental Impact Statement/Environmental Impact Report for the Trinity River Mainstem Fishery Restoration Program (DEIS/EIR) on the delta smelt *(Hypomesus transpacificus)*, Sacramento splittail *(Pogonichthys macrolepidotus)*, and bald eagle *(Haliaeetus leucocephalus)*. The delta smelt was federally listed as a threatened species on March 5, 1993 (Service 1993a). On December 19, 1994, a final rule designating critical habitat for the delta smelt was published (Service 1994c). The Sacramento Splittail was federally listed as threatened February 8, 1999 (Service 1999). The bald eagle was listed as endangered February 14, 1978. The Service originally issued several biological opinions on the CVP OCAP on May 26, 1993

(1-1-93-F-0032), February 4, 1994 (1-1-94-F-0002) and finally March 6, 1995 (1-1-94-F-0070) all which pertained to delta smelt and Sacramento splittail. The Service also issued a biological opinion on CVP operations and the effects on the bald eagle on February 12, 1993 (1-1-93-F-0010).

Additionally, Reclamation has requested that the Service consult pursuant to section 7(a)(2) of the Act as amended relative to the effects of the Preferred Alternative and related actions on the bald eagle and the northern spotted owl (*Strix occidentalis caurina*) within the Trinity River basin. The northern spotted owl was listed as threatened June 26, 1990, and critical habitat was designated for the northern spotted owl May 6, 1991. The reference biological opinions on CVP/SWP operations describe the basic operation of the projects as well as the fundamentals of the conservation measures and overall effects of those actions and should be referred to for the original discussion of effects and basis for non-jeopardy determinations.

Reclamation has determined that the proposed action will not likely adversely affect bald eagles and northern spotted owls in the Trinity River Basin or result in adverse modification or destruction of critical habitat for the northern spotted owl. Provided that all of the avoidance and minimization measures identified in the biological assessment (Service, 2000) are followed the Sacramento Fish and Wildlife Office concurs in this determination. Additionally, should monitoring information arise that identifies that an individual action may affect the bald eagle or the northern spotted owl to a manner or extent not previously considered the Service or other appropriate Federal agency will reinitiate consultation pursuant to section 7 of the Act. Therefore, no further consideration, other than a description of the avoidance and minimization measures, of the bald eagle or the northern spotted owl in the Trinity River Basin will occur in this biological opinion. Reclamation has also requested to reinitiate the February 12, 1993, biological opinion concerning the affects of reservoir operations on bald eagles in Central Valley reservoirs. The Service has determined that the implementation of the Preferred Alternative will not affect the bald eagles in Central Valley reservoirs to a manner or extent not already analyzed in the original February 12, 1993 biological opinion and therefore it will not be addressed further in this biological opinion.

INTRODUCTION

This biological opinion represents the Service's opinion on the effects of implementing the Preferred Alternative identified in the DEIS/EIR in accordance with section 7 of the Act. The proposed actions under the Preferred Alternative are necessary to fulfill the following legislative and legal commitments to restore and maintain the fishery resources of the Trinity River:

1. Public Law 84-386 authorized construction of the Trinity River Division, but also provided for the protection of the fish and wildlife resources of the Trinity River, specifically directing the Secretary of the Interior to ensure that sufficient in-basin flows needed for the maintenance and propagation of fish and wildlife are to take

precedence over diversion of Trinity River water into the Central Valley (Opinion of the Solicitor *Proposed Contract with Grasslands Water District,* December 7, 1979).

2. Public Law 102-575 (CVPIA), § 3402, in which Congress stated an intent "... to protect, restore, and enhance fish, wildlife and associated habitats in the Central Valley and Trinity River Basins..." and "... to address impacts of the Central Valley Project on fish, wildlife, and associated habitats". CVPIA provides for "the restoration and maintenance of the Trinity River fishery" and was passed "in order to meet Federal trust responsibilities" regarding tribal fishery resources, and to promote the fishery restoration goals" of Public Law 98-541, as amended. Those goals are to restore the fish and wildlife populations in the Trinity River basin to the levels approximating those which existed prior to the start of construction of the Trinity River Division and to maintain those levels. In addition, the effectiveness of the restoration "is to be measured not only by returning adult anadromous fish spawners, but by the ability of dependent tribal, commercial, and sports fisheries to participate, through enhanced in-river and ocean harvest opportunities, in the benefits of restoration." Public Law 104-143 § 2, 110 Stat. 1338 (May 15, 1996).

3. In addition, the Secretary is charged by law with the protection and conservation of endangered species (16 U.S.C. §§ 1531 et seq). Most Trinity River salmonid populations are either listed, proposed for listing or under status review for listing under the federal Endangered Species Act.

4. The Indian reserved fishing rights in the Trinity River were quantified in 1993 by an Opinion of the Solicitor, *Fishing Rights of the Yurok and Hoopa Tribes*, M-36975 (October 4, 1993) Department of the Interior; and implemented in a related Magnuson Fishery Conservation and Management Act (16 U.S.C. §§ 1801 et seq.) interpretative rule, 58 Fed. Reg. 68063 (December 23, 1993). The tribal fishing rights have been upheld in Parravano v. Babbitt, 861 F. Supp. 914, 837 F. Supp.1034 (N.D. Calif.), aff'd 70 F.3d 539 (9th Cir. 1995), cert. denied 518 U.S. 1016 (1996).

The Preferred Alternative consists of 6 components: 1) an increased flow regime; 2) a channel rehabilitation program (mechanical restoration); 3) a coarse and fine sediment augmentation program; 4) infrastructure modifications; 5) upslope watershed restoration; and 6) an adaptive management program. Full implementation of the proposed action will be phased in over several years. This phased in approach is necessary because the planning, design, and construction of infrastructure modifications and the first phase of the channel rehabilitation projects will take approximately 2 and 3 years, respectively, depending on funding availability. The U. S. Bureau of Reclamation (Reclamation) is seeking section 7 compliance for the increased flow regime as

that flow regime relates to the Trinity River and other CVP operations. Additionally, Reclamation and the Service are requesting programmatic section 7 compliance for the remaining five components. Although Reclamation and the Service are acting as the nexus for completing the ESA consultation process for the implementation of the increased flow regime component of the Preferred Alternative, other agencies may have the responsibility for implementation of the remaining five components. Site-specific environmental documentation and ESA consultation will be required for the remaining components by the appropriate Federal Lead Agency consistent with the outcome of this biological opinion regardless of which agency takes lead responsibility.

This consultation relates to the effects of the Preferred Alternative only. Any and all project components in prior opinions remain in full force and effect unless modified through this biological opinion. The DEIS/EIR evaluates alternatives at the 2020 level of development. The modeling assumed that there would be approximately 400 thousand acre feet (TAF) of deliveries to State Water Project (SWP) contractors south of the Delta and approximately an additional 300 TAF of deliveries made to Central Valley Project (CVP) contractors north of the Delta by the year 2020 (Personal communication, Tull, 2000). Reclamation, California Department of Water Resources, and the Service are engaged in numerous programs to address the long-term delivery of water through the SWP and CVP. These include but are not limited to CalFED Bay-Delta Program, CVPIA implementation, long-term contract renewal, amendments and modifications of the Coordinated Operations Agreement, as well as site specific programs and projects. All of these programs and projects are subject to future consultation pursuant to section 7 of the Act to determine their effects on listed species and therefore are not addressed here.

CONSULTATION HISTORY

This biological opinion is based on information provided in: 1) the 1994 Biological Assessment on the effects of the Central Valley Project and State Water Project on Delta Smelt and Sacramento Splittail (DWR, 1994); 2) The DEIS/EIR on the Trinity River Mainstem Fishery Restoration Program with appendices; 3) the Biological Assessment for the DEIS/EIR on the Trinity River Mainstem Fishery Restoration Program; 4) the annualized data from the model runs used to develop the DEIS/EIR; and 5) other information contained in Service files.

BIOLOGICAL OPINION

Action Area

The action area is defined in 50 CFR 402.14(g)(3) as the immediate area involved in the action and the entire area where effects to listed species extend as a direct and indirect effect of the action. The action area for this proposed action includes all areas and facilities in the CVP including Shasta and Keswick reservoirs and their operations, the mainstem Sacramento River, the Folsom Reservoir and Lake Natoma and their operations, the American River, the

Sacramento/San Joaquin Delta, Suisun Bay, New Melones Reservoir, the Stanislaus River, Millerton Reservoir and its operations, the mainstem San Joaquin River, Trinity and Lewiston reservoirs and their operations, and the mainstem Trinity River.

Description of the Proposed Action

The proposed action is the implementation of the Preferred Alternative and any consequential modifications of the operation of the CVP consistent with implementation of the Preferred Alternative in the DEIS/EIR. A detailed description of facilities along with the historic and proposed operations of CVP are described in DWR and Reclamation (1994). The proposed operations have been further modified by the objectives outlined in the Principles for Agreement and the SWRCB draft Water Quality Control Plan (WQCP) with exceptions noted in the following section which was the subject of the March 6, 1995 biological opinion (Service, 1995). Operations also include those actions that implement management decisions agreed upon in the August 2, 1994, Framework Agreement (Fourteen-Agency 1994). Additional information on CVP and SWP facilities and operations can be found in Reclamation (1992), DWR and Reclamation (1993), NMFS (1993) and Service (1993b).

The proposed modifications that the Preferred Alternative would implement include the following:

The Preferred Alternative is based on recommendations in the Trinity River Flow Evaluation Study (TRFES) (U.S. Fish and Wildlife Service and Hoopa Valley Tribe, 1999). The alternative would restore the Trinity River ecosystem necessary for the restoration and maintenance of the fishery through managed flows combined with mechanical rehabilitation projects. Flows would be higher than the No Action Alternative in all water-year classes. Flow volumes and timing are designed to address both habitat and temperature needs for all riverine life stages of salmonids within the Trinity River. Peak flows are designed to support the physical processes necessary to maintain habitat in an alluvial river.

The Preferred Alternative also includes an adaptive management program. The adaptive management program would operate within the bounds of the TRFES recommendations. The Preferred Alternative adaptive management program would combine assessment and management by using conceptual and numerical models and the scientific method to develop and test management choices. The adaptive management program would assess the effects of reservoir operations, instream flows, and mechanical habitat manipulations on biotic resources of the Trinity River. Specifically, the program would (1) define objectives in measurable terms; (2) develop hypotheses, build models, compare options, and design system manipulations and monitoring programs; (3) propose modifications to operations that protect, conserve, and enhance biotic resources of the Trinity River; and (4) implement monitoring and research programs to examine how selected management actions meet resource management objectives for restoration of the Trinity River.

As described in the TRFES, the adaptive management program would be administered by a Trinity Management Council composed of fishery agency representatives from Federal, Tribal and County entities overseen by the Secretary of the Interior. The council would serve as a policy group that reviews, modifies, accepts, or remands recommendations forwarded to an executive director made by a technical modeling and analysis team. Also included in the process would be a scientific advisory board, a stakeholder's group, and external peer reviewers. For a complete description of the adaptive management program refer to the DEIS/EIR.

The adaptive management program could result in minor modifications to the Flow Evaluation hydrographs described in this DEIS/EIR. Any modifications will be performed in accordance with applicable laws. All mechanical ground-disturbing actions originating from the adaptive management program, regardless of whether they are described in this document, would be subject to site-specific environmental review.

Water Management. Annual releases would vary by water-year class as shown in Table 1. The release pattern for each water-year class was developed to address the needs of each of the life stages of the anadromous fish present in the Trinity River, including the ability of the river to move sediment and reshape itself (i.e., fluvial geomorphic process). Flow releases are different for each water-year class because different geomorphic processes are addressed in different water-years, as was the case prior to dam construction. Four primary components were identified and are addressed by the release patterns:

- **Summer/fall temperature control flows (July 1 through mid-October)**—These were developed in response to summer and early fall conditions when warm water temperatures are a concern for holding and spawning spring chinook salmon. North Coast Regional Water Quality Control Board criteria follow: from July 1 to September 14, temperatures no greater than 60 degrees Fahrenheit (°F) at Douglas City; from September 15 to September 30, temperatures no greater than 56°F at Douglas City; and from October 1 to December 31, temperatures no greater than 56°F at the confluence with the North Fork. Generally, flows of 450 cubic-feet-per-second (cfs) would be required during these periods to meet these temperatures.

TABLE 1

Annual Flows and Peak Releases for the Flow Evaluation Alternative

Water-year Class	Acre-feet	Peak Flow
Critically dry	369,000	1,500
Dry	453,000	4,500
Normal	636,000	6,000
Wet	701,000	8,500
Extremely wet	815,000	11,000

Peak flow releases and timing: 11,000 cubic feet per second/5 days in May (extremely wet water-year class* only) * Water year classifications for the Trinity River Basin and the Sacramento River Basin are defined differently and therefore a wet or dry year within the Trinity Basin may or may not equate to a wet or dry year within the Sacramento Basin.

- **Salmonid spawning/rearing flows (mid-October through late April/mid-May depending on water-year class)**—These flows were developed to provide suitable spawning and rearing habitat for chinook and coho salmon and steelhead. Flows of 300 cfs would be released during this period, since effective spawning has been observed at this flow level. In addition, such flows would provide habitat, minimize the potential for denaturing of redds, and protect early life stages of salmonids.

- **Fluvial geomorphic/salmonid smolt temperature control flows(late April/mid-May through June 30)**—These were developed to provide fluvial geomorphic processes and suitable temperature and flow conditions for outmigrating salmonid smolts. Peak flows of 11,000 cfs would be released for 5 days beginning May 24 during extremely wet water years to assist in geomorphic processes such as mobilizing sediment, scouring the riverbed, reshaping the channel, and removing encroaching vegetation. The peak levels would vary for each water-year class, down to a minimum of 1,500 cfs in critically dry years. During such years, these flows would not be sufficient to recontour the channel, but would help prevent the germination of unwanted vegetation.

- **Ramping rates (all times of year)** - Refers to the rate at which flow releases are either increased (ramped up) or decreased(ramped down). The ramping rates were developed to mimic natural ramping rates for the Trinity River.

Water Operations. The timing of diversions through the Clear Creek Tunnel would be shifted from spring/summer to the summer and early fall periods to maintain suitable release temperatures for the in river fishery resources of the Trinity River. Summer/fall is a critical period for holding/spawning spring chinook salmon, migrating/spawning fall chinook salmon, and holding summer steelhead. Shifting exports to the summer/early fall maintains cold water reserves in Trinity Reservoir for use in the Trinity River, versus exporting this water earlier to assist cold water maintenance in the Sacramento River. Additionally, exporting water through the Clear Creek Tunnel during summer/ early fall results in water moving quickly through Lewiston Reservoir, thereby not allowing the water (which is eventually released from Lewiston Dam) to warm. The Preferred Alternative assumes that Trinity Reservoir would be operated to maintain a minimum carryover storage of 600TAF between water years. The increased carryover provides cooler water for dam releases for the benefit of the in-river fishery resources of the Trinity River.

Watershed Protection. Watershed protection practices under this alternative would be the same as the No Action Alternative. The following programs and ordinances, relating to overall watershed protection in the Trinity River Basin, would continue. However, the Service has concluded that implementation of these programs, as described, are not likely to adversely affect the bald eagle and the northern spotted owl provided the avoidance and minimization measures described later are implemented. Therefore, the following programs and ordinances are not covered by this biological opinion and, if subsequent effects are identified, will need to obtain site specific compliance under the Act through section 7 or section 10:

- Watershed protection under the jurisdiction of U.S. Forest Service (USFS) and BLM would continue, including implementation of existing land management plans and the Record of Decision on the President's Northwest Forest Plan (U.S. Department of Agriculture and U.S. Department of the Interior, 1994).

- Trinity County's Decomposed Granite Grading Ordinance (No. 379) would be enforced for lands and projects under its jurisdiction.

- California Forest Practice Rules that regulate activities on private lands within the Trinity River Basin, which require erosion control measures that in turn minimize sediment inputs into the river, would be enforced by California Department of Forestry and Fire Protection.

- Implementation of the South Fork Trinity River Action Plan would continue. The Plan includes: watershed restoration to reduce sediment sources, upgrading inefficient irrigation systems and dedicating the saved water to instream fishery flows, cattle exclusion fencing to decrease sediment inputs and improve water quality, and riparian plantings to help decrease water temperatures and conserve streambanks.

- BLM would continue to acquire sensitive lands in the Grass Valley Creek watershed and along the Trinity River mainstem corridor.

Fish Habitat Management. Forty-seven mechanical rehabilitation projects would be constructed because the flow schedule associated with this alternative is too low to remove the existing riparian berms along the river. Once portions of the berms are mechanically removed, high flows and gravel transport would naturally create and maintain dynamic alluvial features and floodplain riparian communities. Consequently, no mechanical maintenance would be planned for the proposed or existing channel rehabilitation projects.

The proposed mechanical rehabilitation projects would involve the following:

- A total of 47 mechanical rehabilitation projects, as noted on Fig 2-4 in the DEIS/EIR, would be constructed between the Lewiston Dam and the confluence with the North Fork Trinity River. The sites would encompass approximately 665 acres. Construction would be scheduled between July 15 and September 15 to minimize impacts to fall chinook, coho, and steelhead.

- Of these 47 mechanical rehabilitation projects, 44 would be channel rehabilitation projects, and the remaining three would be side-channel projects. Twenty-four of the channel projects would be built in the first 3 years, with the remainder to be completed contingent upon an evaluation by the adaptive management program. A typical mainstem rehabilitation project would be approximately 150 feet wide (measured from the water's edge) and 500-5,000 feet long. A typical side-channel improvement would be 80 feet wide and 800 feet long.

- A typical project would take 6 weeks to construct and would require the use of front-end loaders, bulldozers, screens, and trucks.

Coarse and Fine Sediment Management. Two sites (River Miles 110.2 and 111.9) require immediate course sediment supplementation for spawning purposes. The first source of gravel will be the 2,000 yd^3 of screened gravel stored at the Old Lewiston Bridge. Additional gravel may be obtained at dredge tailings downstream of Lewiston. Dredge tailings on the south bank near Lewiston (RM 108.5) and on the south bank at Gold Bar (RM 106.3) are the nearest sources. A secondary benefit realized by utilizing these sources will be the conversion of these areas to functioning flood plains with riparian vegetation.

Additional gravel supplementation will occur annually at these sites. Further, in order to meet downstream course sediment budget deficits, gravel will also be deposited on an annual basis into a large standing wave at the Lewiston gaging station (RM 110.9). Gravel supplementation will occur here during and after peak flow releases for distribution downstream and for the

replacement of gravel transported from the immediate area. The timing and amount of coarse gravel supplementation will vary temporally based on water year type.

Spawning gravel placement would average about 10,300 yd^3 annually, with an estimated range from 0 cubic yards in critically dry water years to 49,100 yd^3 in extremely wet water years (actual amounts would be determined by ongoing monitoring). The estimates assume that there would be no need for additional gravel placement as a result of Safety of Dam releases.

The following measures will be followed to reduce any potential impacts to ESA listed species due to the coarse sediment augmentation program:

- The FWS will coordinate with the NMFS regarding surveys for coho salmon presence prior to implementation of the project. The NMFS and the FWS will also coordinate work windows for these projects, as needed. Surveys for nesting owls and eagles will occur in suitable habitat within a 0.5 mile radius of a project site prior to beginning work activities utilizing motorized equipment or chain saws. If a nesting owl is detected within a 0.25 mile, scheduled work activities will not occur from February 1 through July 9; if a nesting eagle is detected within a 0.5 mile, scheduled work activities will not occur from January 1 through August 31.

- All mechanical equipment used shall be free of grease, oil, or other external petroleum products or lubricants. Equipment shall be thoroughly checked for leaks and any necessary repairs shall be completed prior to commencing work activities. Equipment with rubber tires will be used to place gravel inriver at all three sites.

Fish Population Management. Population management under this alternative would be the same as the No Action Alternative. Fishing would continue under current harvest plans approved by the Klamath Fishery Management Council and the Pacific Fishery Management Council. Fisheries that do not have comprehensive management plans would continue to be managed by the responsible agencies or tribes.

Infrastructure Modifications. Increasing releases from 6,000 to 11,000 cfs for restoration purposes will impact four bridges and inundate private properties downstream to a minimal extent in most cases to almost total inundation for a limited number of parcels. From Lewiston Dam to the confluence with Rush Creek (~5 river miles), releases of 11,000 cfs actually exceed the 100-year Federal Emergency Management Agency (FEMA) flood event of 8,500 cfs, which is based upon a 1976 Flood Study by the Army Corps of Engineers (USACE, 1976). Downstream of Rush Creek, 11,000 cfs would result in a river flow less than the 100-year event

as designated by FEMA. FEMA requires that any replacement bridge not increase the risk of damage to existing structures nor increase the Base Flood Elevation (most probable 100-year flood) more than one-foot.

Bridge Replacement

Four bridges in Trinity County (Salt Flat, Bucktail, Poker Bar, and "Treadwell" on Steelbridge Road) will be replaced in order to accommodate 11,000 cfs releases and associated tributary accretion in May. None of these bridges meets currently recommended design standards for water conveyance and debris clearance at the maximum prescribed flows, and the foundations of each appear to be inadequate to withstand the scouring action of the maximum prescribed flows.

The existing Salt Flat Bridge on Salt Flat Road, off of Goose Ranch Road west of Lewiston at river mile 107, is a privately owned structure serving 27 parcels. The bridge is a single lane, 270-foot-long structure, 10-foot-wide, four-span railway car bridge. The river channel at this site is split at low flow. The left arm is a side channel constructed by Reclamation for fish spawning and habitat purposes.

The existing bridge at Bucktail on Browns Mountain Road, located about .25 miles northeast of Lewiston Road at river mile 105, is a single span, 76-foot-long, 32 foot-wide, steel girder structure with pile-supported concrete abutments which is county owned, and services about 60 parcels. The replacement of Bucktail bridge includes significant local channel improvements to accommodate a bridge of acceptable capacity. The required channel improvements consist of removal and grading a portion of the right floodplain to accommodate the longer length required in a new bridge. The excavation will extend approximately 600-feet upstream and 150-feet downstream of the existing structure.

The existing bridge at Poker Bar on Bridge Road, is located 1.5 miles from State Highway 299, about halfway between the towns of Lewiston and Douglas City at river mile 102. The bridge consists of two privately owned, single-span, railway car structures crossing two main channels (left and right) of the Trinity River and serves 77 parcels. The structure over the right channel is 87-foot-long, 18-foot-wide, and constructed with twin side-by-side railway cars. The car beams are supported on four steel "H"-piles at each abutment. The existing structure over the left channel is 52-foot-long, 20-foot-wide and is also constructed with two side-by-side railroad cars supported on steel "H" piles at each abutment. A concrete retaining wall and two concrete filled, riveted steel caissons are present in front of each of the abutments.

The existing Treadwell bridge is located off Steelbridge Road about 3 miles upstream (east) of Douglas City. It is a privately owned, single-lane bridge and serves 9 parcels. The structure is a four-span, 201-foot-long, 12-foot wide, railway car bridge supported on concrete piers and abutments. Foundation type is unknown at both abutments and at each of the piers. The right

abutment is established in fill encroaching on the river flood plain. The left abutment is established in the bank along the left edge of the channel.

Pre-construction efforts will include procurement of design services, permitting, surveys, design and geotechnical investigations (USBR, 2000). The initial project (first year) will be to perform exploratory drilling at each of the anticipated bridge pier locations to determine depth to bedrock. Actual construction of bridges would occur in the second year. Total project time ranges from 17 to 28 months and depends on the construction window (the period of time equipment is allowed to work within the Trinity River wetted perimeter due to biological constraints). Given the time range of 17 to 28 months, projects that begin in summer 2001 (in pre-construction phase) would be completed by late 2002 to late 2003.

The following measures will be followed to reduce any potential impacts to ESA listed species:

- The FWS will coordinate with the NMFS regarding surveys for coho salmon presence prior to implementation of the project. The NMFS and the FWS will also coordinate work windows for these projects, as needed. Surveys for nesting owls and eagles will occur in suitable habitat within a 0.5 mile radius of a project site prior to beginning work activities utilizing motorized equipment or chain saws. If a nesting owl is detected within a 0.25 mile, scheduled work activities will not occur from February 1 through July 9; if a nesting eagle is detected within a 0.5 mile, scheduled work activities will not occur from January 1 through August 31.

- All mechanical equipment used shall be free of grease, oil, or other external petroleum products or lubricants. Equipment shall be thoroughly checked for leaks and any necessary repairs shall be completed prior to commencing work activities.

- No herbicides or pesticides shall be used.

- All possible measures will be taken to minimize any increased sedimentation/turbidity in the mainstem from mechanical disturbance, such as leaving a small berm at the edge of the channel to trap any sediments until all other work is completed. Turbidity and other Clean Water Act standards as identified by the Water Quality Control Plan for the North Coast Region, will be monitored and maintained. If standards are not met, construction activities will cease until such a time that operations or alternatives can be completed within compliance.

House/Property Relocations

Structures at risk include at least one home, a number of mobile homes and trailers, various outbuildings and portions of access roads. Other improvements such as campgrounds, satellite dishes, garden and animal enclosures, mining operations and water systems would also be affected (USBR, 2000). Inundated lands upstream of Rush Creek and outside of the designated FEMA 100-year floodplain would be purchased or otherwise flood proofed/mitigated. Lands downstream of Rush Creek within the FEMA 100-year floodplain will be mitigated on a case by case basis based on potential damages from implementing the proposed action. Impacted landowners will be contacted, and right-of-entry agreements negotiated to allow control surveys of structures. These activities do not require instream activities or mitigation for streambed disturbances.

The amount of time for home and structure relocation from initial identification and surveys to final actions is expected to be 18 months. Projects that begin in summer 2001 with structure identification and landowner contacts should be completed by summer 2002 to early 2003.

Operational Flexibility. As noted in Reclamation's memo of June 6, 2000, reinitiating consultation, Delta operations would be managed to avoid changes to the environmental baseline in the Delta (as indicated by the location of X2 in February through June (refer to Service, 1995). A process either concurrent with or in parallel to the CVPIA B2 Interagency Team would be used to evaluate potential changes to Delta conditions. Then, if necessary, management actions would be developed to maintain Delta conditions. Such a process would be established and implemented as early in the water year as possible to maximize operational flexibility and identify water management tools for all CVP environmental purposes. If impacts greater then those considered in this opinion are identified reinitiation of consultation would be required.

The biological assessment (Service, 2000) which addresses the effects of the Preferred Alternative on bald eagles and northern spotted owls outlines a number of minimization and avoidance measures that would be implemented. These action are summarized as follows:

- Surveys for nesting owls and eagles shall occur in suitable habitat within a 0.5 mile radius of a project site prior to beginning work activities utilizing motorized equipment or chain saws. If a nesting owl is detected within a 0.25 mile, scheduled work activities will not occur from February 1 through July 9; if a nesting eagle is detected within a 0.5 mile, scheduled work activities will not occur from January 1 through August 31.

- All mechanical equipment used shall be free of grease, oil, or other external petroleum products or lubricants. Equipment shall be thoroughly checked for leaks and any necessary repairs shall be completed prior to commencing work activities.

- No herbicides or pesticides shall be used.

- All possible measures shall be taken to minimize any increased sedimentation/turbidity in the mainstem from mechanical disturbance, such as leaving a small berm at the edge of the channel to trap sediments until all other work is completed.

- Turbidity and other Clean Water Act standards as identified by the Water Quality Control Plan for the North Coast Region, will be monitored and maintained. If standards are not met, construction activities will cease until such a time that operations or alternatives can be completed within compliance.

As described in the Biological Assessment, the following additional measure shall be followed to reduce any potential impacts to ESA listed species due to the coarse sediment augmentation program and dredging:

- All mechanical equipment used shall be free of grease, oil, or other external petroleum products or lubricants. Equipment shall be thoroughly checked for leaks and any necessary repairs shall be completed prior to commencing work activities. Equipment with rubber tires will be used to place gravel in-river at all three sites.

Status of the Species:

Delta smelt

The delta smelt was listed as a threatened species on March 5, 1993 (58 **FR** 12854). The final rule designating critical habitat for delta smelt was published December 19, 1994 (59 **FR** 65255). These final rules describe in detail the factors that have contributed to this species' decline. Please refer to final rules 58 **FR** 12854 and 59 **FR** 65255, the Final Recovery plan for the Sacramento/San Joaquin Delta Native Fishes (Service, 1995), and DWR and Reclamation (1994) for additional information on the biology and ecology of the delta smelt.

Species Description and Life History. The delta smelt is a slender-bodied fish with a steely blue sheen on the sides and seems almost translucent (Moyle 1976). The delta smelt, which has a lifespan of one year, has an average length of 60 to 70 mm (about 2 to 3 inches). It is an euryhaline species (tolerant of a wide salinity range) that spawns in fresh water and has been collected from estuarine waters up to 14 parts per thousand (ppt) salinity (Moyle *et al.* 1992). For a large part of its annual life span, this species is associated with the freshwater edge of the mixing zone (saltwater-freshwater interface, also called X2), where the salinity is approximately 2 ppt (Ganssle 1966, Moyle *et al.* 1992, Sweetnam and Stevens 1993).

The delta smelt is adapted to living in the highly productive San Francisco Bay/Delta Estuary (Estuary) where salinity varies spatially and temporally according to tidal cycles and the amount of freshwater inflow. Despite this tremendously variable environment, the historic Estuary probably offered relatively constant suitable habitat conditions for delta smelt, because they could move upstream or downstream with the mixing zone.

Shortly before spawning, adult delta smelt migrate upstream from the brackish-water habitat associated with the mixing zone in numerous river channels and tidally-influenced backwater sloughs (Radtke 1966, Moyle 1976, Wang 1991). Females with nearly mature eggs were taken at the Central Valley Project (CVP) Tracy Pumping Plant between late December 1990 and April 1991 (Wang 1991). Spawning locations vary widely from year to year (Department and Reclamation 1993). Sampling of larval delta smelt in the Delta suggests spawning has occurred in the Sacramento River; Barker, Lindsey, Cache, Georgiana, Prospect, Beaver, Hog, and Sycamore sloughs; in the San Joaquin River off Bradford Island including Fisherman's Cut; False River along the shore zone between Frank's and Webb tracts; and possibly other areas (Wang 1991). Delta smelt also may spawn north of Suisun Bay in Montezuma and Suisun sloughs and their tributaries.

Delta smelt spawn in shallow, fresh, or slightly brackish water upstream of the mixing zone (Wang 1991). Most spawning occurs in tidally-influenced backwater sloughs and channel edgewaters (Moyle 1976, Wang 1986, 1991, Moyle *et al.* 1992). Although delta smelt spawning behavior has not been observed in the wild (Moyle *et al.* 1992), the adhesive, demersal eggs are thought to attach to substrates such as cattails, tules, tree roots, and submerged branches (Moyle 1976, Wang 1991).

The spawning season varies from year to year and may occur from late winter (December) to early summer (July). Moyle (1976) collected gravid adults from December to April, although ripe delta smelt were most common in February and March. A recent study of delta smelt eggs and larvae (Wang and Brown 1994 as cited in Department and Reclamation 1994) confirmed that spawning occurs from February through June, with a peak in April and May. Spawning has been reported to occur at about 7° to 15° C. Results from a University of California at Davis (UCD) study (Swanson and Cech 1995) indicate that although delta smelt tolerate a wide range of temperatures (<8° C to >25° C), warmer water temperatures restrict their distribution more than colder water temperatures.

Laboratory observations indicate that delta smelt are broadcast spawners that spawn in a current, usually at night (Lindberg 1992 and Mager 1993 as cited in Department and Reclamation 1994). Eggs form an adhesive foot that appears to stick to most surfaces. In these laboratory studies, eggs attached singly to the substrate, with few eggs found on vertical plants and sides of a culture tank (Lindberg 1993 as cited in Department and Reclamation 1994).

Eggs hatched in 9 to 14 days at temperatures from 13° to 16° C during laboratory observations in 1992 (Mager 1992 as cited in Sweetnam and Stevens 1993). In this study, larvae began feeding on phytoplankton on day four, rotifers on day six, and *Artemia nauplii* at day 14. In laboratory studies, yolk-sac fry were found to be positively phototaxic, swimming to the lightest corner of the incubator, and negatively buoyant, actively swimming to the surface. Post-yolk-sac fry were more evenly distributed throughout the water column (Lindberg 1992 as cited in Department and Reclamation 1994). After hatching, larvae and juveniles move downstream toward the mixing zone where they are retained by the vertical circulation of fresh and salt waters (Stevens *et al.* 1990). Pelagic larvae and juveniles feed on zooplankton. When the mixing zone is located in Suisun Bay where there is extensive shallow-water habitat within the euphotic zone (depths less than four meters), high densities of phytoplankton and zooplankton may accumulate (Arthur and Ball 1978, 1979, 1980). Estuarine environments produce an abundance of fish and zooplankton as a result of plentiful food and shallow, productive habitat.

Delta smelt swimming behavior. Observations of delta smelt swimming in the swimming flume and in a large tank show that these fish are unsteady, intermittent, slow-speed swimmers (Swanson and Cech 1995). At low velocities in the swimming flume during spontaneous, unrestricted swimming in a 1-meter tank, delta smelt consistently swam with a "stroke and glide" behavior. This type of swimming is very efficient; Weihs (1974) predicted energy savings of about 50 percent for "stroke and glide" swimming compared to steady swimming. However, the maximum speed delta smelt are able to achieve using this preferred mode of swimming, or gait, is less than 3 body lengths per second, and the fish did not readily or spontaneously swim at this or higher speeds (Swanson and Cech 1995). Juvenile delta smelt proved stronger swimmers than adults. Forced swimming at these speeds in a swimming flume was apparently stressful; the fish were prone to swimming failure and extremely vulnerable to impingement. Unlike fish for which these types of measurements have been made in the past, delta smelt swimming performance was limited by behavioral rather than physiological or metabolic constraints *(e.g.,* metabolic scope for activity; Brett 1976).

Historic and Current Distribution. Delta smelt are endemic to Suisun Bay upstream of San Francisco Bay through the Delta in Contra Costa, Sacramento, San Joaquin, and Solano counties, California. Historically, the delta smelt is thought to have occurred from Suisun Bay upstream to at least the city of Sacramento on the Sacramento River and Mossdale on the San Joaquin River (Moyle *et al.* 1992, Sweetnam and Stevens 1993). Delta smelt have been detected as far upstream as Verona on the mainstem Sacramento River. These fish were detected in the Service's beach seine survey in October of 1994.

Sacramento splittail

The final rule to list the Sacramento splittail was published on February 8, 1999 (64 **FR** 5963). For further information on the splittail refer to the final rule.

Species Description and Life History. Splittail were first described in 1854 by W.O. Ayres as *Leuciscus macrolepidotus* and by S.F. Baird and C. Girard as *Pogonichthys inaeqilobus*. Although Ayres' species description is accepted, the species was assigned to the genus Pogonichthys in recognition of the distinctive characteristics exhibited by the two California splittail species *P. ciscoides* and *P. macrolepidotus* (Hopkirk 1973). *Pogonichthys ciscoides*, endemic to Clear Lake, Lake County, California, has been extinct since the early 1970s. The splittail represents the only extant species in its genus in California.

The name splittail refers to the distinctive tail of the fish. Pogon-ichthys means bearded fish, referring to the small barbels on the mouth of the fish, unusual in North American cyprinids. Macro-lepidotus means large-scaled. The splittail is a large cyprinid fish that can exceed 40 centimeters (16 inches) in length (Moyle 1976). Adults are characterized by an elongated body, distinct nuchal hump, and small, blunt head, usually with barbels at the corners of the slightly subterminal mouth. The enlarged dorsal lobe of the caudal fin distinguishes the splittail from other minnows in the Central Valley of California. Splittail are dull, silvery-gold on the sides and olive-gray dorsally. During spawning season, pectoral, pelvic, and caudal fins are tinged with an orange-red color. Males develop small white nuptial tubercles on the head. Breeding tubercles also appear on the base of the fins (Moyle in prep).

In recent times, dams and diversions have increasingly prevented splittail from upstream access to the large rivers, and the species is now restricted to a small portion of its former range (Moyle and Yoshiyama 1992). However, during wet years, they migrate up the Sacramento River as far as the Red Bluff diversion dam in Tehama County, and into the lowermost reaches of the Feather and American Rivers (Moyle in prep, Jones and Stokes 1993, Charles Hanson, State Water Contractors, *in litt.* 1993). Small numbers of splittail have recently been found in the upper Sacramento and San Joaquin rivers and their tributaries (Baxter 1994). Recent surveys of San Joaquin Valley streams found splittail in the San Joaquin River below its confluence with the Merced River, mainly following wet winters (Moyle in prep). Splittail have also been recorded using the Sutter and Yolo Bypasses for spawning areas during wet winters (Sommer *et al.* 1997). Successful spawning has been recorded in the lower Tuolumne River during wet years in the 1980s, as well as in 1995. Both adults and juveniles were observed at Modesto, 11 km upriver from the mouth of the river (Moyle in prep). However, all of the sightings reported above were during wet years when splittail were able to exploit more spawning habitat. Except for very wet years, the species is for the most part now confined to the Delta, Suisun Bay, Suisun Marsh, and Napa Marsh. In the Delta, they are most abundant in the north and west portions when populations are low, but are more evenly distributed throughout the Delta following years of successful reproduction (Sommer *et al.* 1997).

Splittail are relatively long-lived, frequently reaching 5 to 7 years of age. An analysis of hard parts of the splittail indicate that larger fish may be 8 to 10 years old (Moyle in prep). Females are highly fecund, with the largest females producing over 250,000 eggs (Daniels and Moyle 1983). Populations fluctuate annually depending on spawning success, which is highly

correlated with freshwater outflow and the availability of shallow-water habitat with submerged vegetation (Daniels and Moyle 1983). Fish usually reach sexual maturity by the end of their second year. The onset of spawning is associated with rising water levels, increasing water temperatures, and increasing day length. Peak spawning occurs from the months of March through May, although records of spawning exist for late January to early July (Wang 1986). In some years, most spawning may take place within a limited period of time. For instance, in 1995, a year of extraordinarily successful spawning, most splittail spawned over a short period in April, even though larval splittail were captured from February through early July (Moyle in prep). Within each spawning season older fish reproduce first, followed by younger individuals (Caywood 1974). Spawning occurs over flooded vegetation in tidal freshwater and euryhaline habitats of estuarine marshes and sloughs and slow-moving reaches of large rivers. Larvae remain in shallow, weedy areas close to spawning sites for 10 to 14 days and move into deeper water as they mature and swimming ability increases (Wang 1986 and Sommer *et al.* 1997).

Splittail are benthic foragers. In Suisun Marsh, they feed primarily on opossum shrimp (*Neomysis mercedis*, and presumably, the exotic *Acanthomysis* spp. as well), benthic amphipods (*Corophium*), and harpactacoid copepods, although detrital material makes up a large percentage of their stomach contents (Daniels and Moyle 1983). In the Delta, clams, crustaceans, insect larvae, and other invertebrates also are found in the diet. Predators include striped bass (*Morone saxatilis*) and other piscivores (Moyle 1976).

In recent years, splittail have been found most often in slow moving sections of rivers and sloughs and dead-end sloughs (Moyle *et al.* 1992, Daniels and Moyle 1983). Reports from the 1950's, however, mention Sacramento River spawning migrations and catches of splittail during fast tides in Suisun Bay (Caywood 1974). Because they require flooded vegetation for spawning and rearing, splittail are frequently found in areas subject to flooding. Historically, the major flood basins distributed throughout the Sacramento and San Joaquin valleys provided spawning and rearing habitat. These flood basins have all been reclaimed or modified for flood control purposes (e.g., Yolo and Sutter bypasses). Although primarily a freshwater species, splittail can tolerate salinities as high as 10 to 18 parts ppt (Moyle 1976, Moyle and Yoshiyama 1992). The Department's survey data from 1979 through 1994 indicate that the highest abundances occurred in shallow areas of Suisun and Grizzly bays.

Recent research indicates that splittail will use the Yolo and Sutter bypasses during the winter and spring months for foraging and spawning (Sommer *et al.* 1997). However, the Yolo bypass may only be used by splittail during wet winters, when water from Sacramento River over-tops the Fremont Weir and spills over the Sacramento Weir into the bypass. In 1998, the Yolo and Sutter bypasses provided good habitat for fish, particularly splittail, when they were flooded for several weeks in March and April. In order to provide spawning habitat for splittail, water must remain on the bypasses until fish have completed spawning, and larvae are able to swim out on their own, during the draining process.

Historical and Current Distribution. Splittail are endemic to California's Central Valley, where they were once widely distributed (Moyle 1976). Historically, splittail were found as far north as Redding on the Sacramento River (at the Battle Creek Fish Hatchery in Shasta County), as far south as the present-day site of Friant Dam on the San Joaquin River, and up the tributaries of the Sacramento River as far as the current Oroville Dam site on the Feather River and Folsom Dam site on the American River (Rutter 1908). Recreational anglers in Sacramento reported catches of 50 or more splittail per day prior to the damming of these rivers (Caywood 1974). Splittail were captured in the past in southern San Francisco Bay and at the mouth of Coyote Creek in Santa Clara County, but they are no longer present there (Moyle in prep). The species was part of the Central Valley Native American diet (Caywood 1974).

Evironmental Baseline

The environmental baseline used in this analysis includes past and ongoing impacts of all Federal, State, Tribal, and private actions and other human activities in the vicinity of the project that have impacted, or are impacting the listed species. The action area of the proposed project is generally all Central Valley streams, the Sacramento/San Joaquin Delta, and the Trinity River Basin.

Delta smelt

The March 6, 1995, and the February 12, 1993, (delta smelt and winter-run, respectively) biological opinions on the effects of long-term operation of the CVP and the SWP coupled with the October 13, 1981, Corps export pumping guidance, and the November 2, 1994, biological opinion on the Environmental Protection Agency's proposed Water Quality Standards for the San Francisco Bay/Sacramento-San Joaquin Rivers and Delta have, in conjunction with the 1995 Water Quality Control Plan and a statutory mandate pursuant to Section 3406(b)2 of the CVP Improvement Act to manage 800 TAF of water for fish and wildlife purposes, established the current environmental baseline for delta smelt and splittail. Part of this environmental baseline requires Delta outflows between February 1 to June 30 to transport larval and juvenile delta smelt out of the "zone of influence" of the CVP and SWP export pumps and maintain the location of X2 at or downstream of three distinct points: the confluence of the Sacramento and San Joaquin rivers, Chipps Island, and Roe Island. The length of time X2 must be positioned at these set locations in each month is determined by a formula that considers the previous month's inflow to the Delta and a "Level of Development" factor, denoted by a particular year.

Compliance with the salinity criteria at Roe and Chipps islands can be achieved in any one of the following three ways: (1) the daily salinity value meets the requirement, (2) the system is operated on that day so as to meet the "flow equivalent," or (3) by using a 14-day moving average. The use of the 14-day moving average allows the mean location to be achieved despite the varying strength of tidal currents during the lunar cycle because any 14 day period would

include the full range of spring and neap tidal conditions. Meeting the confluence standard can be achieved by meeting either implementation scheme 1 or 3 above.

Delta modeling conducted by a variety of individuals and agencies for the March 6, 1995, biological opinion analyzed approximately 73 years of hydrologic data from the Sacramento/San Joaquin rivers and Delta. The analysis showed the average position of X2 would be either downstream of the targeted compliance point or would meet the compliance point through an increase in the number of days, over and above the minimum required, in many of the years. This compliance point has been maintained mainly because the export facilities have not had the ability to capture all of the unimpaired run-off and, thus, have been well below the Export-Inflow Ratio providing better environmental conditions than the minimum required by existing regulations. Therefore, the Service was able to provide the CVP and SWP with a non-jeopardy biological opinion on the long-term operation of their projects. Additionally, the Service anticipated that the estuarine conditions for delta smelt would be improved by (1) the signing of the Framework Agreement leading to the Bay-Delta Accord that would require the CVP and SWP to make an equitable contribution to meet the revised water quality standards, (2) the obligation of Federal agencies carrying out programs for the conservation (recovery) of listed species as imposed by section 7 of the Act, and (3) the scheduled renewal or reopening of water contracts and licenses that would provide an additional opportunity to implement Recovery Plan objectives. Collectively, these actions would result in phased improvement to water quality-based habitat requirements.

Due to subsequent wet years, the regulatory requirements have been met every year since 1995. The CVP/SWP were able to meet the compliance point for X2. The CVP/SWP, because of favorable hydrologic conditions, did not need to manage the system to the E/I ratio all of the time. If these beneficial environmental parameters are maintained over time, it is likely that the species would be heading toward recovery. However, these benefits are offset by new projects that are being proposed which are described later. Therefore, rather than improving the environmental baseline with these good water years, it has simply been maintained. Table 2 identifies the number of required days X2 was to be at specific compliance locations and the actual number of days X2 was at or downstream of the required location. These data are based on preliminary data provided by the California Department of Water Resources, Operations Division. This analysis is consistent with how the Service evaluated the original project for which it issued the March 6, 1995 biological opinion (Service, 1995).

TABLE 2

Number of days X2 was required at specific compliance stations and the actual number of days achieved shown by year

Year	Location	# of required days Starting Feb. 1	# of actual days at*** or downstream
1995			
	Confluence	150	Essentially all year
	Chips Is.	150	Essentially all year
	Roe Is.	130	138
1996			
	Confluence	150	249
	Chips Is.	150	161
	Roe Is.	65	126
1997			
	Confluence	150	225
	Chips Is.	110	124
	Roe Is.	49	52
1998			
	Confluence	150	Essentially all year
	Chips Is.	150	262
	Roe Is.	115	167
1999			
	Confluence	150	203
	Chips Is.	143	159
	Roe Is.	51	73
2000			
	Confluence	150	100**
	Chips Is.	150*	100**
	Roe Is.	57*	60**

* Estimated for 2000
** As of May 10, 2000
*** These are estimated days based on electrical conductivity at Port Chicago, Mallard Slough, and Collinsville

Adult delta smelt spawn in central Delta sloughs from February through August in shallow water areas having submersed aquatic plants and other suitable substrates and refugia. These shallow water areas have been identified in the Delta Native Fishes Recovery Plan (Recovery Plan) (Service 1995) as essential to the long-term survival and recovery of delta smelt and other resident fish. A "no net loss" strategy of delta smelt population and habitat is proposed in this Recovery Plan.

Delta smelt are adapted to living in the highly productive Estuary where salinity varies spatially and temporally according to tidal cycles and the amount of freshwater inflow. Despite this tremendously variable environment, the historical Estuary probably offered relatively consistent spring transport flows that moved delta smelt juveniles and larvae downstream to the mixing zone. Since the 1850s, however, the amount and extent of suitable habitat for the delta smelt has declined dramatically. The advent in 1853 of hydraulic mining in the Sacramento and San Joaquin rivers led to increased siltation and alteration of the circulation patterns of the Estuary (Nichols *et al.* 1986, Monroe and Kelly 1992). The reclamation of Merritt Island for agricultural purposes, in the same year, marked the beginning of the present-day cumulative loss of 94 percent of the Estuary's tidal marshes (Nichols *et al.* 1986, Monroe and Kelly 1992).

In addition to the degradation and loss of estuarine habitat, the delta smelt have been increasingly subject to entrainment, upstream or reverse flows of waters in the Delta and San Joaquin River, and constriction of low salinity habitat to deep-water river channels of the interior Delta (Moyle *et al.* 1992). These adverse conditions are primarily a result of drought and the steadily increasing proportion of river flow being diverted from the Delta by the CVP and SWP (Monroe and Kelly 1992). There is a correlation between the proportion of delta smelt that reside in Suisun Bay and overall abundance. This relationship indicates that the summer townet index increased dramatically when outflow was between 34,000 and 48,000 cfs which placed X2 between Chipps and Roe islands. Placement of X2 downstream of the Confluence, Chipps and Roe islands provides delta smelt with low salinity and protection from entrainment, allowing for productive rearing habitat that increases both smelt abundance and distribution.

The results of seven surveys conducted by the Interagency Ecological Program (IEP) corroborate the dramatic decline in delta smelt attributable to baseline conditions. Existing operations were meant to provide sufficient Delta outflows from February 1 through June 30 to transport larval and juvenile delta smelt out of the "zone of influence" of the CVP and SWP pumps, and provide them low salinity, productive rearing habitat. This zone of influence has been delineated by Water Resources's Particle Tracking Model and expands or contracts with CVP and SWP combined pumping increases or decreases, respectively (Department and Reclamation 1993). Tidal action may enhance the hydraulic effects of exports which in turn may effect larvae and juveniles as far west as the Confluence.

According to seven abundance indices which provide information on the status of the delta smelt, this species was consistently at low population levels through the 1980s (Stevens *et al.* 1990). These same indices also showed a pronounced decline from historical levels of abundance (Stevens *et al.* 1990).

Specifically, the summer townet abundance index constitutes one of the more representative indices because the data have been collected over a wide geographic area (from San Pablo Bay upstream through most of the Delta) for the longest period of time (since 1959). The summer townet abundance index measures the abundance and distribution of juvenile delta smelt and

provides data on the recruitment potential of the species. Since 1983, (except for 1986, 1993, and 1994), this index has remained at consistently lower levels than previously found. These consistently lower levels correlate with the 1983 to 1992 mean location of X2 upstream of the Confluence, Chipps and Roe islands.

The second longest running survey (since 1967), the fall midwater trawl survey (FMWT), measures the abundance and distribution of late juveniles and adult delta smelt in a large geographic area from San Pablo Bay upstream to Rio Vista on the Sacramento River and Stockton on the San Joaquin River (Stevens *et al.* 1990). The fall midwater trawl indicates the abundance of the adult population just prior to upstream spawning migration. The index that is calculated from the FMWT survey uses numbers of sampled fish multiplied by a factor related to the volume of the area sampled. Until recently, except for 1991, this index has declined irregularly over the past 20 years (CDFG unpublished data, 1999). Since 1983, the delta smelt population has exhibited more low fall midwater trawl abundance indices, for more consecutive years, than previously recorded. The 1994 FMWT index of 101.7 was a continuation of this trend. This occurred despite the high 1994 summer townet index for reasons unknown. The 1995 summer townet was a low index value of 319 but resulted in a high FMWT index of 898.7 reflecting the benefits of large transport and habitat maintenance flows due to an extremely wet year.

The FMWT abundance index (128.3) for 1996 represented the fourth lowest on record. For 1997, the abundance index (360.8) almost tripled over last years results. In 1998, the summer townet index was 3.3 and the fall index was 417.6, which was up slightly from the 1997 index. Recovery criteria, including both abundance and distribution criteria based on numbers derived from the FMWT, have not been met to date. This limited data indicates that delta smelt may not be moving toward recovery.

The Service issued a non-jeopardy biological opinion (1-1-95-F-110) for the Delta Wetlands Project after significant negotiations and changes to the proposed project description. The original project description significantly degraded the estuarine conditions by adversely affecting Delta hydrology and causing incremental up-stream shifts of X2. The Delta Wetlands Project, as modified, includes conditions to minimize up-stream shifts of X2 and adverse effects to Delta hydrology within the action area. The Service issued a draft jeopardy biological opinion for the Interim South Delta Program as the original project significantly degraded the estuarine conditions by adversely affecting Delta hydrology and causing incremental up-stream shifts of X2. The Service has also issued a biological opinion for the issuance of a water contract to the County of Sacramento for 35,000 acre feet of water to be diverted from the American River. The opinion for Sacramento County evaluated a phased approach to delivery of new water with very small increments of water to be delivered for the first few years and that the larger amount would be fully evaluated in the context of a broader section 7 consultation when OCAP is reinitiated at the long-term contract renewal phase of CVPIA. Additionally, the Service just completed a consultation with Reclamation concerning additional supplies to Contra Costa Water District

(CCWD) under their existing contracts consistent with CCWD's Future Water Supply Program. The outcome of this opinion specifically states that additional supplies over and above those which were authorized in the original biological opinions for the Los Vaqueros Project would not be authorized until a new biological opinion on OCAP was completed or Reclamation reinitiated consultation.

Regarding the operation of the existing consultation for the Los Vaqueros Project, during May and June of 1999, over 100,000 delta smelt were incidentally taken at the State and Federal export facilities. However, none were found to have entered CCWD's intake at Old River during this same period. Pursuant to the operations plan in the Los Vaqueros biological opinion, there were no diversions during two weeks of the period in question; however, when diversions resumed, no smelt were found to pass through the screen in the monitoring program.

Delta smelt remained in the Delta for an extended period of time during the spring of 1999. It was hypothesized that it was a result of cooler water temperatures. The final summer townet index for 1999 was 11.9, an increase from the 1998 index of 3.3. However, this is still below the pre-decline average of 20.4 (1959-1981, no sampling 66-68). The FMWT index for 1999 is 864 which is a moderate level.

Other projects, which have not under gone section 7 consultation, have been proposed and include East Bay Municipal Utility District amended contract renewal, development of a long-term contract with El Dorado County Water Agency, numerous Warren Act contracts, funding or facilitation of infrastructure improvements that will allow for additional withdrawals from CVP supplies with CVP facilities, or through other mechanisms. These projects likely would result in a deterioration of the environmental baseline, causing X2 to incrementally move up-stream if these projects proceed as proposed. Degradation of the environmental baseline may significantly affect recovery and survival of delta smelt

Sacramento splittail

The decline in splittail abundance has taken place during a period of increased human-induced changes to the seasonal hydrology of the Delta, especially the increased exports of freshwater from the Delta and increased diversions of water to storage. These changes include alterations in the temporal, spatial, and relative ratios of water diverted from the system. These hydrological effects, coupled with severe drought years, introduced, non-native aquatic species, the loss of shallow-water habitat to reclamation activities, and other human-caused actions, have reduced the splittail's capacity to recover from natural seasonal fluctuations in hydrology for which it was adapted.

Analyses of survey data collected from 1967 to 1993 (Meng 1993, Meng and Moyle 1995), further analyses by the Service using data from 1967 through 1997 (Service, 1999), CDFG,

University of California at Davis, and biologists from several different studies reveals the following trends:

1. Overall, splittail abundance indices have declined. Meng and Moyle (1995) demonstrated that on average, splittail have declined in abundance by 60 percent through 1993. These data were updated by the CDFG to include the most current data available. The Service conducted the statistical analysis using the updated information. The results were similar. These updated data demonstrate that on average, splittail have declined significantly in abundance by 50 percent since 1984. The greatest declines (over 80 percent) were found from studies that sampled the shallow Suisun Bay area, the center of the range of the species (Meng and Moyle 1995). The updated information also shows a significant decline (43 percent) for the studies that sampled the shallow Suisun Bay area. The Bay study that began in 1980 in the lower Estuary, at the outermost edge of splittail range, showed the least percent decline (20 percent) (CDFG, unpublished data) through 1993. The Bay study analysis completed on the updated data also showed the smallest decline for study (6 percent). The number of splittail young taken at State and Federal pumping facilities (per acre-foot of water pumped), as of 1993, had declined 64 percent since 1984. With the updated data, the number of splittail young taken at State and Federal pumping facilities demonstrated a 97 percent increase. This percent increase is due to the unusually high salvage that occurred during 1995.

   Splittail populations are estimated to be 35 to 60 percent of what they were in the 1940s, and these estimates may be conservative (Moyle in prep). Department midwater trawl data indicate a decline from the mid-1960s to the late 1970s, followed by a resurgence, with yearly fluctuations, through the mid-1980s. From the mid-1980s through 1994, splittail numbers have declined in the Delta, with some small increases in various years. This decline is also demonstrated in the updated Department data.

2. Overall splittail abundances vary widely between years. Sommer *et al.* 1997 also found that splittail recruitment success fluctuates widely from year to year and over long periods of time. During dry years abundance is typically low. During the dry years of 1980, 1984, 1987, and 1988 through 1992, splittail abundance indices for young-of-the-year were low, indicating poor spawning success. Additionally, all year class abundances were low during these years. In 1994, the fourth driest year on record, all splittail indices were extremely low.

   Wet years are assumed to provide essential habitat for splittail and allow populations to rebound from dry years. Successful reproduction in splittail is often highly correlated with wet years. Large pulses of young fish were observed

in wet years 1982, 1983, 1986, and 1995. In 1995, one of the wettest years in recent history, an increase in all indices was recorded, as in 1986, which was another wet year following a dry year. However, young of the year taken per unit effort (for example, either the number of fish per net that is towed or the number of fish per volume of water sampled) has actually declined in wet years, from a high of 12.3 in 1978 to 0.3 in 1993. The updated data from CDFG demonstrate this same decline in wet years, from 37.3 in 1978 to 0.6 in 1993. The abundance indices of splittail during the years of 1995, 1996, and 1997 were 44.5, 2.1, and 2.6, respectively. In 1995, a very wet year, splittail abundances were high. However in 1996 and 1997, both wet years, abundance indices were low. A large splittail year class was produced in 1998, a wet year. However, overall splittail declines remain high (82 percent/43 percent with updated data) in the shallow-water Suisun Bay area, the center of its distribution.

3. A strong relationship exists between young-of-the-year abundance and outflow (i.e., river outflow into San Francisco Bay after water exports are removed). As outflow increases, annual abundance of young-of-the-year splittail increases. Changes in outflow account for 55 to 72 percent of the changes seen in young-of-the-year splittail abundance, depending on which survey data are analyzed.

4. Splittail are most abundant in shallow areas of Suisun and Grizzly bays where they generally prefer low-salinity habitats. Salinities in Suisun and Grizzly bays increase when, as a result of water exports or drought conditions, the mixing zone (the freshwater-saltwater interface) shifts upstream.

5. Concentration of splittail in shallow areas suggests that they are particularly vulnerable to reclamation activities, such as dredging, diking, and filling of wetlands. The above data indicate that splittail abundances vary widely in response to environmental conditions, but the general population numbers are declining.

Changes in water diversions are most likely at the SWP. For the most part, the Federal pumping plant has operated at capacity for many years (pumping at rates up to 4,600 cfs), so increased exports at this plant are unlikely. However, the SWP pumping plant and the State Aqueduct have considerable unused capacity. The SWP currently pumps at rates up to 6,400 cfs and plans to increase pumping rates by more than 50 percent. Local private water diversions are relatively stable and export up to 5,000 cfs from about 1,800 diversions scattered throughout the Delta. The DWR (1992) reported past and projected SWP deliveries from Delta sources during the years of 1962 to 2035. In the 1980s, deliveries ranged from 1.5 million acre-feet to 2.8 million acre-feet. By 2010, deliveries of up to 4.2 million acre-feet are planned.

If the exceedingly high take (millions of fish) at the export facilities that occurred in 1995 continues to occur in other wet years, the species may be precluded from recovery. In a good year such as 1995, splittail spawn in prolific numbers. These good years are needed to maintain the population of splittail in the Delta. However, the high take that occurs during these years, offsets the benefits that a strong year class may provide.

Those projects discussed in the Delta Smelt Environmental Baseline section have also under gone section 7 consultation for their effects to splittail. Additional future deliveries made south of the Delta through SWP or CVP facilities, additional supplies provided to contractors or new water supply contracts that effect carryover storage in reservoirs, facilities that are developed to divert additional instream flows, or other water development projects that result in losses of instream flows, greater entrainment of splittail, or reduce the areal extent of flood plain inundation for splittail spawning will degrade the environmental baseline for splittail such an extent that it may preclude recovery for the splittail.

Effects of the Proposed Action

General

The proposed action is the implementation of the Trinity River Restoration Program which affects operation of the CVP and SWP. A detailed description of facilities and historic and proposed operations of CVP and SWP are described in DWR and Reclamation (1994) and in the March 6, 1995 biological opinion (Service, 1995). The proposed operations have been further modified by the objectives outlined in the Principles for Agreement and the SWRCB draft WQCP with exceptions noted in the following section. The proposed operations also include those actions that implement management decisions agreed upon in the August 2, 1994, Framework Agreement (Fourteen-Agency 1994). Additional information on CVP and SWP facilities and operations can be found in Reclamation (1992), DWR and Reclamation (1993), NMFS (1993), and Service (1993b).

The DEIS/EIR states that the Preferred Alternative would, compared to the No Action Alternative, operate the Trinity River Division (TRD) to release more Trinity Reservoir water to the Trinity River for fishery restoration. The pattern of exports to the Central Valley would be shifted to later in the summer in order to maintain reservoir storage to help meet Trinity River instream temperature requirements for threatened coho, and chinook and steelhead salmon. (The movement of exports through Lewiston Reservoir helps minimize warming in the reservoir and the resultant release temperatures into the Trinity River). Compared to the No Action Alternative, the Preferred Alternative generally has a larger spring peak releases. Peak Trinity River flows during extremely wet years would increase from 2,000 to 11,000 cfs (a 5-fold increase); during critically dry years, releases would be reduced from 2,000 to 1,500 cfs (a reduction of 25 percent). The long-term average annual instream release would increase by 240,000 af (75 percent) compared to the No Action Alternative.

Compared to the No Action Alternative, the Preferred Alternative would reduce long-term average annual exports from the TRD to the Sacramento Basin by about 240,000 af (28 percent). Dry-period annual exports would be reduced by 160,000 af (30 percent). Under the Preferred Alternative, the prescribed minimum storage in Trinity Reservoir would be 600,000 af. Dry-period storage would average 5 percent more than No Action, reflecting the greater carryover storage level. In spite of this increase in required minimum carryover storage, average end-of-water-year carryover storage would decrease by 50,000 af (4 percent). Whiskeytown Reservoir water levels would be generally unaffected, including during the dry period.

Shasta Reservoir storage would be only slightly impacted due to reduced TRD exports in the long-term average, while dry period effects would be more substantial. In the Preferred Alternative, long-term average end-of-water-year storage is only slightly less than the No Action Alternative (60,000 af decrease, or 2 percent), while dry-period levels drop 130,000 af (8 percent). The Biological Opinion issued by NMFS for winter-run chinook salmon prescribed an end-of-water year minimum storage criterion of 1.9 million acre feet (maf). The minimum carry over criterion is met with the same frequency under the Preferred Alternative as under No Action (12 percent for both alternatives).

Long-term average annual CVP deliveries decrease by 90,000 af (2 percent) compared to No Action. Reductions during the dry period average 160,000 af (4 percent). Annual Delta exports through the Tracy Pumping Plant are reduced by 60,000 af (2 percent) over the entire long-term period and 90,000 af (4 percent) during the dry period. Annual Delta inflow would decrease by 220,000 af (1 percent) over the long-term period and 90,000 af (1 percent) during the dry period. Average annual Delta outflow would decrease by 150,000 af (1 percent) over the long-term period, but would be similar to No Action for the dry period.

Delta Smelt and Sacramento Splittail

The DEIS/EIR and associated appendices identify that, because of these changes in the diversion pattern from the TRD to the Sacramento River, there will be effects of implementing the Preferred Alternative for Delta native fishes. The DEIS/EIR evaluated several alternatives, including existing conditions, no action, cumulative conditions and several project alternatives. All of the project alternatives that were evaluated include all the assumptions of the no action alternative at the 2020 build out. It is important to note some of the assumptions for these alternatives to put the effects of the Preferred Alternative in proper context. First, the existing conditions alternative is essentially the existing conditions alternative in the CVPIA Programmatic Environmental Impact Statement (PEIS). This alternative evaluates conditions with 1995 level of development in place with existing environmental requirements and delivery capability. Second, the no action alternative is essentially the no action alternative in the CVPIA PEIS and evaluates the conditions as they might be at the 2020 level of development. The no action alternative assumes an additional 400 TAF of delivery within the SWP, mainly south of the Delta and 300 TAF of additional water delivery within the CVP mainly to urban interests

north of the Delta (personal communication Tull, 2000). The project alternatives superimpose the effects of their actions on the no action alternative. The cumulative conditions analysis is a reflection of the implementation of other State, Federal, and local actions that are reasonably foreseeable. These include the implementation of the rest of the CVPIA other than the Trinity River decision at hand. This was done to isolate the effects of the Trinity River Decision from the remainder of the CVPIA, which was dealt with in the CVPIA PEIS. In order to segregate the incremental effect of the Preferred Alternative against the no action alternative the effects discussion that occurs below, is based in part on the model results, and assumes that the effects of the no action above existing conditions have been subtracted from the Preferred Alternative. This portrays the effect of the Preferred Alternative as if it were implemented against the existing condition.

In the Central Valley, the allowable ratio of Delta inflows to exports, agreed upon in the Delta Accord, were not exceeded for any year simulated. However, during June, and to a lesser degree, April and May, Delta reductions in outflows were greater than 10 percent for up to 9 percent of the years simulated (Table 3). Those reductions in Delta outflows may be significant and may adversely affect habitat for Delta species. As is noted in Table 3, the 9 percent of the years where June had a reduction of outflow of 10 percent or more equates to 6 years out of the 68 years modeled. These reductions in outflow translate into 4 years in a shift upstream in X2 of 1 kilometer (km) or more with a maximum shift of 1.5 km. Another 12 years (approximately 18 percent) had detectable

TABLE 3

Percent of Years with Delta Outflows at Least 10 Percent Less than the Baseline Compared to No Action

Month	Maximum Flow	Preferred Alternative	Percent Inflow	State Permit
February	4	0	1	0
March	1	0	0	0
April	1	1	0	0
May	4	1	3	0
June	9	9	3	0

reductions in outflow which translated into upstream shifts in X2 although 5 of those years were within the error of the model (+ or - 3%). All of these June impacts occurred in either wet or above normal years as defined under the 40-30-30 water year classification.

Further evaluation of the remaining months of the Preferred Alternative indicates that of the 68 years modeled:

- 32 Februarys resulted in reductions in outflow that translated into upstream movement of X2. The maximum movement of X2 for February was 1km and that occurred in 2 years. Approximately 9 (13 percent) of the detectable X2 movements were outside the error of the model.

- 28 Marches resulted in reductions in outflow that translated into upstream movement of X2. The maximum movement of X2 for March was 0.6km and that occurred in 1 year. Approximately 3 (4 percent) of the detectable X2 movements were outside the error of the model.

- 16 Aprils resulted in reductions in outflow that translated into upstream movement of X2. The maximum movement of X2 for April was 1.6km and that occurred in 1 year. Approximately 2 (3 percent) of the detectable X2 movements were outside the error of the model.

- 24 Mays resulted in reductions in outflow that translated into upstream movement of X2. The maximum movement of X2 for May was 1km and that occurred in 2 years. Approximately 6 (9 percent) of the detectable X2 movements were outside the error of the model.

The analysis indicates that at no time did the situation arise where a particular standard such as Chipps Island or Roe Island would not have been met as a result of the Preferred Alternative that otherwise would have been.

Reclamation and the Service in the Biological Assessment, and confirmed in the discussion above, have concluded that adverse effects to delta smelt and Sacramento splittail will occur as a result of implementation of the Preferred Alternative. However, as is stated in the request for reinitiation of section 7 consultation by Reclamation, CVP operations in the Delta would continue to be managed to avoid or minimize the changes to environmental conditions in the Delta. Reclamation has proposed that a team similar to the CVPIA B2 Interagency Team be used to evaluate and recommend changes in operations should adverse impacts be identified. Therefore, based on these commitments, the Service has concluded that the effects to delta smelt and Sacramento splittail will not be jeopardized by implementing the Preferred Alternative. Additionally, the Service has concluded that there will not be an adverse modification or destruction of critical habitat for the delta smelt.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions affecting listed species and their critical habitat that are reasonably certain to occur in the area considered in this biological opinion. Future Federal actions not related to this proposed action are not considered in determining the cumulative effects, but are subject to separate consultation requirements pursuant to section 7 of the Act.

Delta Smelt and Sacramento Splittail. Cumulative effects on the delta smelt, splittail, or delta smelt designated critical habitat include any continuing or future non-Federal diversions of water that may entrain adult or larval fish or that may decrease outflows incrementally, thus shifting the position of the delta smelt's preferred habitat upstream. Water diversions through intakes serving numerous small, private agricultural lands and duck clubs in the Delta, upstream of the Delta, and in Suisun Bay contribute to these cumulative effects. These diversions also include municipal and industrial uses, as well as providing water for power plants.

Additional cumulative effects result from the impacts of point and non-point source chemical contaminant discharges. These contaminants include selenium and numerous pesticides and herbicides associated with discharges related to agricultural and urban activities. Implicated as potential sources of mortality for delta smelt and splittail, these contaminants may adversely affect delta smelt and splittail reproductive success and survival rates. Spawning habitat may also be affected if submersed aquatic plants used as substrates for adhesive egg attachment are lost due to toxic substances. State or local levee maintenance may also destroy or adversely modify critical habitat by disturbing spawning or rearing habitat and resuspending contaminants into the water.

The introduction of exotic species may occur when levees are breached or when separate creeks or river systems are reconnected during various projects. Several exotic species may adversely affect the delta smelt and splittail, including the Asian clam (*Potamocorbula amurensis*) and three non-native species of euryhaline copepods. The Asian clam could potentially play an important role in affecting the phytoplankton dynamics. The exotic copepods may displace native species and at least one species of copepods (*Sinocalanus doerri*) is difficult for larval fishes to catch because of its fast swimming and effective escape response. Reduced feeding efficiency and ingestion rates weaken and slow the growth of young and make them more vulnerable to starvation and predation.

Other cumulative effects include: wave action in water channels caused by boats may degrade riparian and wetland habitat and erode banks; the dumping of domestic and industrial garbage may present hazards to the fish because they could become trapped in the debris, injure themselves, or ingest the debris; golf courses may reduce habitat and introduce pesticides and herbicides into the environment; oil and gas development and production remove habitat and may introduce pollutants into the delta; agricultural uses on levees may reduce riparian and

wetland habitats; residential or agricultural land use can fragment and reduce wildlife habitat and corridors; unscreened agricultural diversions throughout the delta divert all life stages of the fish (Service 1995); and grazing activities may degrade or reduce suitable habitat.

Conclusion

After reviewing the current status of the delta smelt, splittail, the environmental baseline, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of these species, or result in the destruction or adverse modification of critical habitat for delta smelt.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the Reclamation so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. Reclamation has a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

This incidental take statement **does not** authorize any incidental take associated with the increased delivery of water that was identified in the No-action Alternative modeling results by either the SWP or CVP over and above that which was analyzed in the original March 6, 1995 biological opinion. If increases in water contracts, construction of infrastructure, funding or facilitating project or non-project water through SWP or CVP facilities, or changes in operations

of the SWP or CVP may effect environmental conditions in the Delta in a manner or to and extent not previously considered as part of this consultation, reinitiation of section7 concerning on the long-term operations of the SWP and CVP will be required.

In summary, upon implementation of the following reasonable and prudent measures, incidental take associated with implementation of the Preferred Alternative which will result in an average annual reduction of 240TAF of Trinity River water from being diverted into the Sacramento River Basin will result in incidental take of delta smelt and Sacramento splittail.

Delta Smelt and Sacramento Splittail

The level of take for delta smelt and Sacramento splittail is difficult to quantify in terms of numbers of individuals because of the variation in population size and distribution. However, upon implementation of the following reasonable and prudent measures it is anticipated that no more delta smelt or Sacramento splittail will be subject to incidental take than described in the March 6, 1995 biological opinion (Service, 1995) and will become exempt from the prohibitions described under section 9 of the Act for the proposed project. Delta smelt and Sacramento splittail may be harmed, harassed, injured, or killed by direct entrainment in association with the proposed project and will be exempted under section 9 of the Act. No other forms of take are authorized under this opinion.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to delta smelt, Sacramento splittail, or destruction or adverse modification of critical habitat of delta smelt. The Sacramento splittail does not have designated critical habitat, so no critical habitat for this specie will be destroyed or modified.

Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize the impacts of the Preferred Alternative:

- Reclamation shall minimize the effects of reoperating the CVP resulting from the implementation of the Preferred Alternative within the Trinity River Basin on listed fish in the Delta.

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

To implement Reasonable and prudent Measure number one Reclamation must implement the following:

- If Reclamation in its annual operations planning process detects that implementation of the Preferred Alternative will result in an upstream (eastward) movement of X2 in any month between February 1 through June 30 of 0.5 km, Reclamation shall incorporate within its operating plan measures that can and will be implemented to minimize or eliminate such upstream movements.

Reporting Requirements

Reclamation or the Service shall require personnel to report immediately any information about take or suspected take of listed species Reclamation or the Service shall immediately notify the appropriate Service office within one working day of any such information. Notification must include the date, time, and precise location of the incident/specimen, and any other pertinent information. For non-fish species Reclamation or the Service shall submit locality information to the Service and Department, using completed California Native Species Field Survey Forms or their equivalent, no more than 90 calendar days after completing the last field visit of the project site. Each form shall have an accompanying scale map of the site such as a photocopy of a portion of the appropriate 7.5 minute U.S. Geological Survey map and shall provide at least the following information: township, range, and quarter section; name of the 7.5' or 15' quadrangle; dates (day, month, year) of field work; number of individuals and life stage (where appropriate) encountered; and a description of the habitat by community-vegetation type. The Service contact shall be the Division Chief, Endangered Species Division at (916) 414-6620. Any killed fish specimens that have been taken shall be properly preserved in accordance with Natural History Museum of Los Angeles County policy of accessioning (10% formalin in quart jar or freezing). Information concerning how the fish was taken, length of the interval between death and preservation, the water temperature and outflow/tide conditions, and any other relevant information shall be written on 100% rag content paper with permanent ink and included in the container with the specimen. Preserved specimens shall be delivered to the Service's Division of Law Enforcement at 2800 Cottage Way, Room W-2928, Sacramento, California 95825-1846, phone (916) 414-6660.

CONSERVATION RECOMMENDATIONS

Sections 2 (c) and 7(a)(1) of the Act direct Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species and the ecosystems upon which they depend. Conservation recommendations are Service suggestions regarding discretionary agency activities to promote the recovery of listed species. Therefore, the Service recommends the following additional action to promote the

recovery of federally listed species and their habitats.

- Reclamation should assist in the implementation of the recovery plans for the species discussed in this biological opinion.

In order for the Service to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

This concludes both informal and formal consultation on the proposed implementation of the Trinity River Mainstem Fishery Restoration Program. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the proposed action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (4) a new species or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

If you have any questions regarding this biological opinion, please contact Michael Thabault of my staff at (916) 414-6600.

Wayne S. White

Literature Cited

Arthur, J.F. and M.D. Ball 1980. The significance of the entrapment zone location to the phytoplankton standing crop in the San Francisco Bay-Delta Estuary. U.S. Dept. Interior Water and Power Resources Service.

Arthur, J.F. and M.D. Ball 1979. Factors influencing the entrapment of suspended material in the San Francisco Bay-Delta Estuary. Pages 143-174 *in* T.J. Conomos, editor. Pacific Division, Amer. Assoc. Advance. Sci., San Francisco, California.

Arthur, J.F. and M.D. Ball 1978. Entrapment of suspended materials in the San Francisco Bay-Delta Estuary. U.S. Dept. Interior, Bureau of Reclamation, Sacramento, California.

Baxter R., 1994. August 1994 gill net survey to determine distribution, relative abundance, and proximity to shore of splittail in the Sacramento-San Joaquin Estuary. Annual Report of the Interagency Ecological Program, Resident Fishes Project Workteam. 6 pp

Brett, J.R. 1976. Scope for metabolism and growth of sockeye salmon, *Oncorhynchus nerka*, and some related energetics. J. Fish. Res. Bd. Can. 33:307-313.

Caywood, M.L. 1974. Contributions to the Life History of the Splittail *Pogonichthys macrolepidotus* (Ayres). M.S. Thesis, California State U., Sacramento. 77 pp.

Daniels, R.A. and P.B. Moyle 1983. Life history of splittail (Cyprinidae: *Pogonichthys macrolepidotus*) in the Sacramento-San Joaquin Estuary. Fishery Bulletin 84-3:647-654.

Department of Water Resources. 1992. Data and computations used to determine 1993 water charges. Bulletin 132-92, Appendix B. California Department of Water Resources, Sacramento, California. 136 pp.

Department of Water Resources and U.S. Bureau of Reclamation, Mid-Pacific Region 1993. Effects of the Central Valley Project and State Water Project on delta smelt. 134 pp.

Department of Water Resources and U.S. Bureau of Reclamation, Mid-Pacific Region 1994. Effects of the Central Valley Project and State Water Project on delta smelt and Sacramento splittail. 230 pp.

Foe, Christopher. 1995. Evaluation of the potential impact of contaminants on aquatic resources in the Central Valley and Sacramento-San Joaquin Delta Estuary. Central Valley

Ganssle, D. 1966. Fishes and decapods of San Pablo and Suisun bays. Pp.64-94 *in* D.W. Kelley, ed.: Ecological studies of the Sacramento-San Joaquin Estuary, Part 1. Calif.

Dept. Fish and Game, Fish Bulletin No. 133.

Hopkirk, J.D. 1973. Endemism in the fishes of the Clear Lake region of central California. Univ. Calif. Publ. Zool. 96.

Jones and Stokes Assoc., Inc. 1993. Sutter Bypass fisheries technical memorandum II: Potential entrapment of juvenile chinook salmon in the proposed gravel mining pond. May 27, 1993. (JSA 91-272). Sacramento, California. Prepared for Teichert Aggregates, Sacramento, California. 31 pp + Appendix.

Meng, L. 1993. Status of Sacramento splittail and longfin smelt. Report submitted to U.S. Fish and Wildlife Service, August 1993.

Meng, L. and P.B. Moyle. 1995. Status of Sacramento splittail in the Sacramento-San Joaquin Estuary. Transactions of the American Fisheries Society. 124:538-549.

Monroe, M.W. and J. Kelly 1992. State of the Estuary: A report on conditions and problems in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. San Francisco Estuary Project, Oakland, California. Regional Water Quality Control Board, Memorandum 60, June, 1995.

Moyle, P.B. 1976. Inland Fishes of California. University of California Press, Berkeley, California. 405 pp.

Moyle, P.B. 1998. In preparation: The revised Inland Fishes of California. University of California Press, Berkeley, California. 405 pp.

Moyle, P. B., B. Herbold, D. E. Stevens, and L. W. Miller 1992. Life history and status of delta smelt in the Sacramento-San Joaquin Estuary, California. Trans. Am. Fish. Soc. 121:67-77.

Moyle, P.B. and R. M. Yoshiyama 1992. Fishes, aquatic diversity management areas, and endangered species. A plan to protect California's native aquatic biota. Draft report prepared for California Policy Seminar, University of California, Berkeley, California. July 1992. 196 pp.

Nakamoto, R.J. and T. Hassler. 1992. Selenium and other trace elements in bluegills from agricultural return flows in the San Joaquin Valley, CA. Archives of Environmental Contamination and Toxicology 22:88-98.

National Marine Fisheries Service 1993. Biological opinion for the operation of the Federal Central Valley Project and the California State Water Project. February 12, 1993. 81 pages plus attachments.

National Marine Fisheries Service 1995. Amendment to the February 12, 1993, biological opinion for the operation of the Federal Central Valley Project and the California State Water Project. May 17, 1995. 13 pages.

Nichols, F.H., J.E. Cloern, S.N. Luoma, and D.H. Peterson 1986. The modification of an Estuary. Science 231:567-573.

Radtke, L. D. 1966. Distribution of smelt, juvenile sturgeon, and starry flounder in the Sacramento-San Joaquin Delta. Pp. 115-119 in J. L. Turner and D. W. Kelley, eds.: Ecological studies of the Sacramento-San Joaquin Estuary, Part 2. California Department of Fish and Game Fish Bulletin No. 136.

Rutter, C. 1908. The fishes of the Sacramento-San Joaquin basin, with a study of their distribution and variation. Bulletin of U.S. Bureau of Fisheries 27(637):103-152.

Sommer, T., R. Baxter and B. Herbold. 1997. Resilience of splittail in the Sacramento-San Joaquin Estuary. Transactions of the American Fisheries Society. 126:961-976.

Stevens, D. E., S. W. Miller, and B. C. Bolster 1990. Report to the Fish and Game Commission: A status review of the delta smelt (*Hypomesus transpacificus*) in California. California Department of Fish and Game Candidate Species Status Rept. 90-2. 149 pages.

Swanson, C. And J. J. Cech, Jr. 1995. Environmental tolerances and requirements of the delta smelt, *Hypomesus transpacificus*. Final Report. 77 pp.

Swanson, G.A., M.I. Meyer and J.R. Serie. 1974. Feeding ecology of breeding blue-winged teals. J. Wild. Mang. 38:396-407.

Sweetnam, D.A. and D.E. Stevens 1993. Report to the Fish and Game Commission: A status review of the delta smelt (*Hypomesus transpacificus*) in California. Candidate Species Status Report 93-DS. 98 pages plus appendices.

U.S. Fish and Wildlife Service 1993a. Endangered and threatened wildlife and plants; Determination of threatened status for the delta smelt. March 5, 1993. Fed. Reg. 58(42):12854-12864.

U.S. Fish and Wildlife Service 1994(a). Formal consultation on the 1994 operation of the Central Valley Project and State Water Project: Effects on delta smelt. 34 pages, plus figures.

U.S. Fish and Wildlife Service 1994(b). Endangered and threatened wildlife and plants; Proposed determination of threatened status for the Sacramento splittail. January 6, 1994. Fed. Reg. 862-869.

U.S. Fish and Wildlife Service 1994(c). Endangered and threatened wildlife and plants; Critical habitat determination for the delta smelt. December 19, 1994. Fed. Reg. 65256-65279.

U.S. Fish and Wildlife Service 1995. Formal consultation and conference on the effects of long-term operation of the Central Valley Project and State Water Project on the threatened delta smelt, delta smelt critical habitat, and proposed threatened Sacramento splittail. 52 pages, plus figures and attachment.

U.S. Fish and Wildlife Service 1995. Sacramento-San Joaquin Delta Native Fishes Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon

U.S. Fish and Wildlife Service 1999. Endangered and threatened wildlife and plants; Final Rule to list the Sacramento Splittail as Threatened. February 8, 1999. Fed. Reg. 5963-5981.

U.S. Fish and Wildlife Service and Hoopa Valley Tribe. 1999. Trinity River Flow Evaluation, Final Report. June 1999

U.S. Fish and Wildlife Service and U.S. Bureau of Reclamation, 2000. Biological Assessment for those Actions in the Preferred Alternative of the Proposed Preferred Trinity River Mainstem Fishery Restoration Program that may effect Listed Species and their Critical Habitat.

Wang, J.C.S. 1986. Fishes of the Sacramento-San Joaquin estuary and adjacent waters, California: A guide to the early life histories. Interagency Ecological Study Program for the Sacramento-San Joaquin Estuary. Tech. Rept. 9.

Wang, J.C.S. 1991. Early life stages and early life history of the delta smelt, *Hypomesus transpacificus*, in the Sacramento-San Joaquin Estuary, with comparison of early life stages of the longfin smelt, *Spirinchus thaleichthys*. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Tech. Rept. 28.

Weihs, D. 1974. Energetic advantages of burst swimming of fish. J. Theor. Bio. 48:215-229.