U.S. Fish and Wildlife Service Comments on Volume I: Ecosystem Restoration Program Plan, June 13, 1997.

Appendix 1: Specific Comments on ERPP Volume I

General Comments

Throughout the document, the terms enhance, restore, and create are used. These terms need to be formally defined and ranked in terms of expense, commitment, and risk of failure. Generally, the top priority should be protection of and enhancement of existing habitat, particularly threatened and endangered plants. However, considering that over 90% of wetlands, 90-95% of riparian forests, and 99% of grasslands in the Bay Delta and Central Valley ecosystems have been lost, habitat creation should be a major ERPP objective, and high priority. Also, there may be cases where creating habitat to link existing habitat (connectivity) is a higher priority than enhancing or restoring small isolated existing habitat patches which have relatively lower functional value on a landscape or ecosystem scale. Service staff are available throughout the priority setting and implementation process to assist in avoiding or minimizing adverse affects of habitat modification.

Even for a programmatic approach, the descriptions found in "Implementation Objectives, Targets, and Programmatic Actions", are too vague. We recommend that the "Implementation Objectives, Targets, and Programmatic Actions" be replaced or supplemented with specific actions, or even actions found in other programs such as those found in the "Integration with Other Restoration Programs" section.

Salinity patterns should be an ecosystem process element; the plan should have a specific vision, implementation objectives, targets, and programmatic actions for preferred salinity patterns. Altered salinity patterns should be thoroughly discussed in the Visions for Reducing or Eliminating Stressors Section; if not as a specifically listed stressor, then under Water Diversions. Salinity patterns (spatial and temporal) are a key ecological attribute in estuaries affecting essential biological and physical processes, including nutrient dynamics, productivity and trophic dynamics, and habitat distribution, spatial and temporal extent, and availability. Altered freshwater flow into the Bay-Delta ecosystem, with resulting altered salinity patterns, has caused considerable ecological impacts in the Bay-Delta (Nichols et al 1986, Science 231: 567-573). Yet, the ERPP does not present a vision for salinity patterns; does not discuss salinity patterns in any of the ecological process visions, such as bay-delta hydraulics; and, does not directly discuss the impacts of altered salinity patterns or a vision for reducing or eliminating these impacts either separately or under water diversions. This is a major shortfall of the ERPP that must be rectified.

The "stressors" that are discussed are focused on aquatic ecosystems; additional stressors, such as urban/suburban growth and resultant habitat alteration and loss, which also affect terrestrial ecosystems, should also be addressed.

Several places in the document refer to the "Central Valley Improvement Act (CVPIA)". All references should be: "Central Valley Project Improvement Act (CVPIA)".

OVERVIEW

Pages 8-9, Table 1, "HABITATS". We recommend that the vision statements for all habitats listed in this table include quantity and quality statements. For example, the vision for seasonal wetlands should be "Increase the area of seasonal wetlands, and to improve the quality of existing seasonal wetlands."

Pages 10-13, Table 1, Summary of Visions for Ecosystem Elements. In the "Species and Species Groups" section, we recommend that the ERPP include and discuss the federal and state endangered California least tern (*Sterna antillarum browni*) and the burrowing owl (*Athene cunicularia*), a state species of special concern. Below are brief discussions of both species.

Least Tern. Least tern breeding colonies have been documented at six locations in San Francisco and Suisun bays: (1) PG&E Pittsburg, (2) Port Chicago, (3) Naval Air Station Alameda, (4) Oakland Airport, (5) Alvarado Salt Ponds, (6) and Bair Island. The most significant of these colony sites is Naval Air Station Alameda, which supported 244 nesting pairs and produced 316 fledglings in 1997. Least terns forage for fish in open waters within San Francisco and Suisun bays and diked salt ponds in San Francisco Bay. The success of least tern breeding colonies in these locations is closely linked to the availability and abundance of suitable fish prey items throughout and subsequent to the breeding season in the open waters and diked salt ponds of San Francisco and Suisun bays. The ERPP should include a vision for the California least tern, such as: "The vision for the California least tern is to assist with the conservation of this species by ensuring protection and enhancement of appropriate breeding colony sites and foraging areas within San Francisco and Suisun bays. Stressors to the population and habitat will be reduced or eliminated." The ERPP also should include and discuss California least terns throughout the appropriate sections of the document.

Burrowing Owl. The burrowing owl is a species found in the Delta and Central Valley which is not considered in the ERPP, but one which could potentially be benefitted through implementation of the ERPP or adversely affected by CALFED actions. The burrowing owl is a species which should be considered in all CALFED actions. The following information is provided to assist in developing actions to protect and assist in the recovery of this species.

From a state wide survey conducted in 1991-93 almost 30% of the total owls were found in the Mid Central Valley and Bay Area Interior regions and over 97% of these were in lowland

areas (CALFED termed- upland habitat). These are the same areas where the vast majority of the agricultural and industrial development and a major portion of the residential development in California has occurred and is expected to continue to occur.

In agricultural areas of the Central Valley, rodenticide are often used on levees to control the number of ground squirrels and other fossorial mammals that tend to undermine the levees with their diggings. Exposure to rodenticide and direct killing of owls may be problematic where owls nest along levees. Further, herbicides are often sprayed to control plant growth along levees. Moreover, the periodic elimination of ground squirrels by any means likely inhibits persistence of the local population of owls which depend on the squirrels for nest burrows. Large numbers of burrowing owls nest adjacent to agricultural fields that receive intensive and extensive pesticides. Chemicals used for control of rodents or as pesticides could adversely affect the productivity and/or survivorship of owls that occupy agricultural areas.

In the bay area, over 65% of the groups of owls known to exist in the 1980's were absent during censuses in the 1990's and, even when new groups located during the 1990's were included, there was still a 51% decline in the number of groups since the 1980's. This evidence suggests a strong decline, especially in the Bay Area, in the numbers and distribution of burrowing owls in California from as recently as the 1980's. The species occurred in the 1980's as at least occasional breeder in Marin, San Francisco, and Santa Cruz counties, but all recent breeding sites were abandoned by the 1990's. Moreover, the population around the north end of San Francisco, San Pablo, and Suisun Bays has been reduced to a small remnant, if indeed, it still exists at all. If the same processes that caused the disappearance of small groups of breeding burrowing owls in the 1980's continue to operate in the 1990's it is unlikely that the remaining small populations in central western California will persist.

Thus, the distribution of burrowing owls in California, places them squarely in conflict with continued development and agricultural practices in the state, especially in the bay area. The relatively continuous nature of owl habitat in Central Valley and the fact that owl populations there, while in decline, are still rather widespread, suggests that the Central Valley should be one of the primary focal areas for efforts to preserve the burrowing owl in California.

Page 12, Table 1, "Waterfowl". Insert something like: "The vision for waterfowl is to maintain healthy populations at levels that can support consumptive (e.g. hunting) and nonconsumptive (e.g. bird watching) uses consistent with the goals and objectives of the Central Valley Habitat Joint Venture as part of the North American Waterfowl Management Plan."

ECOLOGICAL PROCESS VISIONS

Page 16, Table 2, Stream Meander Corridors. A stream meander *corridor* is not a process. Stream meandering is a process but a corridor is not a process. We suggest either changing the terminology or reevaluate the intent.

Central Valley Streamflows

Page 21, Central Valley Streamflows, Resource Descriptions, last paragraph. Add that the Delta's ecological dynamics have dramatically changed due to channelization, levee construction, water flow pattern modifications, and water quality deterioration. Attempting to emulate natural runoff patterns is an initial step towards improving ecological functions dependent on streamflow. An adaptive management program would be used to further adjust flows and flow patterns. In addition, under Ecological Functions of Streamflow, first paragraph, mention that natural stream process have been restricted in many locations by the construction of levees and other streambank revetment.

Page 23, Central Valley Streamflows, Multipurpose Water Management. Explain how fish flows are currently managed in a multipurpose manner.

Page 24, Central Valley Streamflows, Vision, first paragraph. A brief discussion of stream flow accretions and streambed losses should be included here. Also include a description of water quality related to stream flows, as reducing or increasing flows, while maintaining constant discharges, has effects on ecosystem water quality.

Page 25, Central Valley Streamflows, Linkage with other Ecosystem Elements, bullet 1. Add the Delta. Add two additional bullets: Water quality dilution, and groundwater/surface water interactions.

Stream Meander Corridors

Page 33, Stream Meander Corridors, Introduction, "Major factors that limit natural stream channel migration . . .". Include as another major limiting factor the storage of water in, and modified release pattern of water from, the State Water Project and the Central Valley Project storage facilities.

Page 35, Integration With Other Restoration Programs. Add the Cosumnes River Preserve as a bullet here. The Preserve is a joint project of TNC, DOI, DWR, CDFG, WCB, and possibly others.

Central Valley Stream Temperatures

Page 46, Central Valley Stream Temperatures, Vision, paragraph 1, "The vision for Central Valley stream temperatures is to restore natural seasonal patterns of water temperature . . by protecting and improving ecological process that regulate water temperature . . .". The "natural seasonal pattern" may not be appropriate for the ERPP to emulate below Keswick Dam and other reservoirs. The natural pattern below Keswick likely had warmer water temperatures much of the year. However, winter-run and other salmon and steelhead are now prevented by the dams from accessing their historic spawning grounds in the upper watersheds, which would exhibit that seasonal pattern of colder water temperatures. This is partially mitigated by the ability to use the cold water stored in Shasta Reservoir to manipulate water temperatures downstream of Keswick. Consideration should also be given in the ERPP to other native fish and aquatic species that may be affected by altered water temperatures.

Page 46, Central Valley Stream Temperatures, Vision, paragraph 4,"Extremely warm water in 1976 and 1977 was likely a major cause of the decline in winter-run chinook salmon. Additional system wide effects, such as the Red Bluff Diversion Dam, have likely contributed to the sustained low population of winter-run chinook throughout the period following the 1976-77 drought years, even when water temperature impacts have been moderated.

Page 46, Central Valley Stream Temperatures, Vision, paragraph 4, line 14. The Shasta Reservoir carryover storage should not drop below 1.9 to meet the NMFS Biological Opinion. Change "1.7" to "1.9" between ". . .should not drop below" and "million acre-feet. . ."

HABITAT VISIONS

While the ERPP is an ecosystem restoration, not species, approach designed to restore ecological processes and conditions, adding a list or table identifying which listed and other special plant and animal species are to be considered within each habitat type would be very valuable. At the least such a list should include all species with federal and/or state status (listed, proposed, candidate and species of concern) and those key species essential to ecosystem function and structure. This would provide the reader a means for quick overview of the scope of the habitats portion of the plan. Our understanding is that plants will be considered in future versions of the ERPP Species and Species Groups Visions. Never the less, a comprehensive species list by habitat type is extremely important to identify which plant species are specifically considered in the plan. Rare plant community types should be specifically addressed somewhere in the plan.

Habitat quality must be considered in relative terms. Improving habitat quality for one species does not necessarily improve quality for all species, even within a habitat type. It is important that the plan address how this issue will be dealt with when decisions must be made about particular restoration or management actions and their effects on various plant and animal species.

There are many types of riparian vegetation. The Riparian and Riverine Aquatic Habitats section would be improved by a discussion of how and to what extent this diversity will be evaluated and addressed as the plan is developed and implemented.

References should be provided.

Page 74, Table 7. This table appears to be incomplete.

Tidal Perennial Aquatic Habitat

Pages 75-77, Tidal Perennial Aquatic Habitat. Submerged aquatic vegetation (SAV), including seagrass, communities/habitat should be included here. Seagrass provide valuable habitat for fishes and invertebrates in San Pablo Bay and north San Francisco Bay (Kitting 1993, Investigation of San Francisco Bay Shallow Water Habitat, NOAA/NMFS Report). This is true for other SAV, plus SAV provides important foraging habitat for waterfowl. San Pablo Bay contains the greatest acreage of seagrass of any water body in the San Francisco Bay estuarine system. (Wyllie Echeverria and Rutter, 1989, Inventory of Eelgrass in San Francisco/ San Pablo Bay, NMFS Report) The relative present-day rarity of seagrass beds suggest that it could be considered an "endangered" or "threatened" habitat in the Bay-Delta system (after approach of Noss et al 1995, Endangered Ecosystems of the United States, USDOI/NBS Report). Therefore, the ERPP should discuss SAV, including seagrass, and develop an implementation objective, targets, programmatic actions to protect and restore SAV habitat under Visions for Tidal Perennial Aquatic Habitat.

Page 76, Tidal Perennial Aquatic Habitat, Integration with Other Restoration Programs. Add the Central Valley Habitat Joint Venture (CVHJV) and the North American Waterfowl Management Plan (NAWMP).

Page 77, Tidal Perennial Aquatic Habitat, Implementation Objective, Targets and Programmatic Actions. The document should reference the source of the 7,000 ac. and 2,500 ac. restoration target numbers.

Non Tidal Perennial Aquatic Habitat

Page 79, Nontidal Perennial Aquatic Habitat, Integration with Other Programs. Include CVHJV and NAWMP.

Midchannel Islands and Shoals

Page 84, Midchannel Islands and Shoals, Introduction, paragraph 1. The typical midchannel island in the Delta is tule marsh; woody riparian plants are atypical. We suggest saying: "They typically support tule marsh, and to a lesser extent willow shrub and bare tidal flats, and associated wildlife and fish."

Page 84 and 85, Midchannel Islands and Shoals, Resource Description. This 11 paragraph section could be significantly shorter and convey the same meaning.

Page 84, Midchannel Islands and Shoals, Resource Description, paragraph 1. The words "unique and remnant" are overused and inappropriately used.

Page 84, Midchannel Islands and Shoals, Resource Description, paragraph 2, sentence 1. Makes no sense; simply delete the sentence.

Page 84, Midchannel Islands and Shoals, Resource Description, paragraph 8, last sentence. Insert the word "Delta-spawning". Most Delta-spawning fish spawn in shallow water.

Page 84, Midchannel Islands and Shoals, Resource Description, paragraph 11, next to last sentence. Delete the sentence "Using midchannel islands as a buffer between the main stream and the island levees may also have harmful effects."

Page 86, Midchannel Islands and Shoals, Vision, last paragraph. This paragraph wrongly implies that reducing boat wake and wind waves will result in sediment deposition and wetland establishment. However, the sediment recruitment from the watershed has been greatly reduced by dams on most major rivers and streams tributary to the Delta and will not be offset by passive measures. In most cases, sediments will need to be actively placed, or steps taken to construct sediment traps to create new sites for emergent wetlands to develop. Connecting midchannel islands to larger islands is a vision for the Delta reaching beyond the scope of just midchannel islands and shoals; perhaps this sentence belongs in another resource vision section.

Seasonal Wetlands

Page 95, Seasonal Wetlands. Seasonal wetlands are defined on page 77 to include vernal pools, wet meadows or pastures, and managed wetlands (for duck clubs). Managed wetlands (wetlands surrounded by levees) need to be considered separately from seasonal wetlands because they have replaced an extensive area (52,000 acres) of the marshlands. Vernal pool allotments are already described separately on page 96. Managed wetlands and vernal pools should be removed from the definition of seasonal wetlands and treated as separate categories.

The vision, as earlier described on page 83, discusses removal of levees from managed wetlands to improve tidal flow, yet throughout this allotment section the ERPP proposes to construct an *additional* 3,000 acres of seasonal (managed?) wetlands. CALFED appears to be creating conflicting goals by, on one hand, seeking to construct addtional managed wetlands, and yet choosing to remove them at the same time. Removing managed wetlands from the definition could clarify this situation. If the intent is to remove the levees of managed wetlands for tidal flow and expand wet meadows or pastures, this intent needs to be clearly stated.

Although tidal wetlands currently comprise only one tenth of the original marsh wetlands, the vision proposes to construct only 1,500 acres of additional tidal wetlands. This seems disproportional particularly when viewed with the discussion on page 78, "levee construction and bank protection have led to the loss of riparian, wetland, and shallow-water habitat throughout the North Bay and adjacent marshes". Tidal wetlands habitat is most needed by endangered species. The ERPP should reverse the allotments, or conduct a study to determine priorities and justify allotments.

The proposed location(s) for potential construction of 3,000 acres of seasonal (managed?) wetlands needs to be stated. This information should be clearly stated as a table and map that describes where and how many acres and what types of wetlands will be available, i.e. vernal pools, wet meadows, managed wetlands, and other seasonal wetlands. Unlike elsewhere in the delta, there may not be 3,000 acres of agricultural lands available to restore to wetlands. The majority of agricultural lands have been already been converted to managed wetlands.

The following figures were provided by the Suisun Resource Conservation District and should be incorporated in the document:

managed wetlands	52,000 acres (including Grizzly Island);
unmanaged tidal wetlands	6,300 acres;
bays and sloughs	30,000 acres;
uplands and grasslands	27,700 acres.

Page 95, Implementation Objective, Targets, and Programmatic Actions. Are the Montezuma Wetlands project acreage included? If so, state how much of the acreage is from the Montezuma Wetland project. Consult the San Francisco Bay Area Wetlands Ecosystem Goals Project before determining allotment numbers. Discuss how allotment numbers were determined.

Page 97, Habitat Visions, Seasonal Wetlands, paragraph 1, line 6. Add vernal pool plants to the list of species which are included.

Page 97, Vision, paragraph 2 and page 98, Implementation Objective. The restoration vision for seasonal wetlands described here only includes the Delta and Suisun Marsh/North San Francisco Bay ecological zones. This is too narrow and is also not fully consistent with the delta green ground beetle vision to restore seasonal wetlands in areas of delta green ground beetle habitat. Expand to include other ecological zones, including the Yolo Basin. Please provide references for this section.

Riparian and Reverine Aquatic Habitats

Page 100, Habitat Visions, Riparian/Riverine. Passive restoration plans for riparian communities that depend on reestablishment of natural processes should consider control of exotic plant species that may gain an early advantage. When acquiring lands for riparian restoration, CALFED should also consider acquisition of suitable upland communities, such as grassland, in order to establish habitats for wildlife species that use both forest and open grassland, such as Swainson's hawks.

The document should state the methods used to determine the target of 16,000 to 24,000 acres of riparian lands on the Sacramento River between Red Bluff and Colusa.

Page 104, Riparian/Riverine Aquatic Habitat, Implementation Objective, Targets, and Programmatic Actions, paragraph 2. This is very unclear as written. Is the intent to protect 16,000-24,000 acres of existing riparian or restore that much? Or is it a combination of both? The document should be revised to clearly indicate the intent and provide the rationale for the large range, 16,000 to 24,000 acres.

Inland Dune Scrub Habitat

Page 107, Inland Dune Scrub Habitat, Introduction and Resource Description and page 108, Linkage to Other Ecosystem Elements. The Service is not aware of an area named the "Antioch Dunes Ecological Reserve." Change to "Antioch Dunes National Wildlife Refuge."

G-006187

Page 107, Resource Description, paragraph 1. Rather than implying that all remaining habitat areas are now protected, this paragraph should state that most of the remaining area of the habitat is protected to various degrees.

Page 108, Linkage with Other Ecosystem Elements. Linkages with other ecosystem elements are not made clear. One important connection that could be made here is the function of river flows in depositing sands that feed the dune formations. Also, this paragraph contradicts the preceding Resource Description section in saying that the habitat is restricted to only one locality.

Please provide references for this section.

Perennial Grassland

Page 110-111, Perennial Grassland, Vision and subsequent sections. More emphasis should be placed on control of exotic vegetation and restoration of natives.

Page 111, Linkage with Other Ecosystem Elements. Grasslands provide flood control functions by slowing and extending storm flow events (links to Streamflows, Natural Floodplains and Flood Processes, and Hydraulics). Linkage to vernal pools was mentioned earlier but should be repeated briefly here. Grassland cover reduces erosion. These links should be added to this section.

Page 111, Implementation Objective, Targets, and Programmatic Actions. Intensive management, to control non-native vegetation and enhance native grass and other plant species, is vital to the success of native perennial grassland restoration, but is not explicit in this section. This element should be added in an additional bulleted objective.

Since natural (unmanaged) reestablishment of native perennial grasslands in the Central Valley is unlikely at present, the final paragraph should be amended to read: "Restoring ... would also create "opportunities" for the "managed" reestablishment of "perennial"grasslands elsewhere in the Central Valley."

Please provide references for this section.

Agriculture Lands

Page 114, Agricultural Lands. Throughout, this section neglects the wildlife benefits of reducing irrigation water use and underemphasizes adverse effects of croplands on native ecosystem elements.

Page 113, Introduction, first sentence. Insert "to agricultural and urban lands" following "Central Valley" and before "some wildlife species . . ."

Page 114, Vision. The programmatic vision for agricultural lands should include effective incentives for agricultural water conservation that could result in significant reductions in average per-acre water use. These vision elements should be added to this section and to the vision summary on page 10. Numerical targets should be included in the Implementation section.

The programmatic vision for agricultural lands should also include a major reduction in selenium-bearing runoff from agricultural lands in the Central Valley, notably from the western San Joaquin Valley. This vision element should be added to this section and to the vision summary on p. 10. Target numerical reductions and dates should be included in the Implementation section.

The programmatic vision for agricultural lands should include a reduction in the impacts of agricultural pesticide use on non-target native wildlife and plants. This vision element should be added to this section and to the vision summary on p. 10. Reductions could be pursued in multiple ways, including more strategically targeted application and timing of pesticide use, use of less environmentally damaging alternative compounds or cultural methods, greater use of biological control, and greater use of other integrated pest management methods. Again, this vision element might be achieved through the use of incentive programs.

Page 114, Agricultural Lands, Integration with Other Restoration Programs. Include: The CVHJV, Valley Care (Ducks Unlimited), and the Agricultural-Wildlife Incentive Program (CVPIA).

Page 115, Linkage with Other Ecosystem Elements. The following linkages with other ecosystem elements should be added to this section: 1) crop and urban acreage generally replace and so are subtracted from natural ecosystem acreage, 2) water diversions for crop and pasture irrigation reduce Central Valley streamflows and alter the hydraulics and foodweb of the Bay-Delta ecosystem, and reduce the quality of the Bay-Delta and its tributaries as habitat for numerous fish and other species, 3) pesticide use on agricultural lands causes harm to a variety of non-target native species, 4) major water control structures that supply agricultural irrigation needs also reduce natural fluvial sediment supply, and 5) agricultural lands often exist in floodplains where crop protection conflicts with objectives of maintaining or restoring natural flood processes.

Page 115, Implementation Objective, Targets, and Programmatic Actions. See paragraphs above on the Agricultural Lands Vision subsection, for objectives to incorporate into these implementation objective, targets, and actions.

Please provide references for this section.

SPECIES AND SPECIES GROUP VISIONS

Some plant species (e.g. federal and state listed species) should be considered for inclusion in the list of species here rather than just in the habitat sections.

Similarly, rare community types (e.g. Mixed Great Valley Riparian Forest, Mature Great Valley Cottonwood Riparian Forest, Great Valley Valley Oak Riparian Forest, Northern Claypan Vernal Pool and others) are worthy of specific attention here (as species groups) or in the habitats section. Because rare communities are as unique, valuable and irreplaceable as rare species are, the Ecosystem Restoration Program Plan would be strengthened in scope and credibility by their specific consideration.

Page 124, Table 10. This table is incomplete. There should be more dots.

Delta Smelt

Page 126, Delta Smelt, Introduction, third sentence. This paragraph states delta smelt are most abundant in Montezuma Slough, Suisun Bay, and the western Delta. There should be some clarification made here. Beginning in December and continuing through perhaps July 1, delta smelt migrate upstream to spawn and are, therefore, more abundant in the Delta.

Page 128, Linkage with Other Ecosystem Elements. Maintenance of rearing habitat is extremely important for the recovery of delta smelt and other native Delta species. Successful restoration of delta smelt will also be closely tied with improving Delta outflow that maintains an X2 location in Suisun Bay for rearing delta smelt and keeps them out of the influence of the CVP/SWP export facilities.

Page 128, Implementation Objective, Targets, and Programmatic Actions. Insert between first and second action, the following: Maintain Delta outflow once larvae and juveniles have reached downstream rearing habitat to keep them out of the "zone of influence" of the CVP/SWP and agricultural diversions and increase the residence time of X2 at key locations in Suisun Bay (Roe Island, Chipps Island, and Collinsville).

Page 128, Implementation Objective, Targets, and Programmatic Actions, second bullet. The CVP/SWP have been known to take great numbers of up-migrating delta smelt, thus limiting the spawning potential of this threatened species. Reword the later half of this sentence so diversions are reduced when all life stages of delta smelt are in the Delta.

Page 129, 3rd bullet. Improving handling and salvage practices at diversions for delta smelt, although a good idea, is likely to be extremely difficult given the delicate nature of this species. Increased efforts should be made to avoid entrainment in the first place.

Page 129, 4th bullet. Reduce water diversions from the Delta when all life stages of delta smelt are present in the Delta.

Page 129. Add another bullet: Implement the Delta Native Fish Recovery Plan..

Western Spadefoot and California Tiger Salamander

Page 172, Western Spadefoot and California Tiger Salamander, Introduction, first sentence. The ranges of the western spadefoot and California tiger salamander are addressed together. Because their ranges are substantially different, they should be discussed separately. In addition, the range of western spadefoot extends down the Pacific coast into Baja California, Mexico. Also of note is the distinct nature of the Sonoma and Santa Barbara County populations of California tiger salamander.

Page 172, Western Spadefoot and California Tiger Salamander, Introduction, third sentence. The sentence, which is meant to discuss reasons for the decline of the species, is unclear. Probably reductions in these species are associated with urban conversion and conversion to irrigated agriculture that creates habitat for competitors and predators and promotes the spread of non-native species. Clarify the sentence. See also Fisher, R.N. and B. Shaffer. 1996. The decline of amphibians in California's Great Central Valley. Conservation Biology 10: 1387-1397.

Page 172, Western Spadefoot and California Tiger Salamander, Resource Description, paragraph 1, last sentence. The sentence states that "abundance from population to population" is influenced by size and quality of habitat in fragmented pockets. It is unclear that population sizes are *necessarily* associated with habitat size or degree of fragmentation. Fragmentation may be more important in the context of altered gene flow patterns among populations. Clarify what is meant by the sentence and cite references to support the concept.

Page 172, Western Spadefoot and California Tiger Salamander, Resource Description, second paragraph, third sentence. The sentence states that vernal pools covering more than 250

G-006191

square feet provide optimal habitat for California tiger salamander. Cite a reference to support this.

Page 172, Western Spadefoot and California Tiger Salamander, Resource Description, paragraph 2, fourth sentence. The sentence states that surface movements are associated with the onset of late-winter and early spring rains. It may be more accurate to state that surface movements are associated with fall and springs rains (see Morey, S.R. and D.A. Guinn. 1992. Activity patterns, food habits, and changing abundance in a community of vernal pool amphibians. *In* Williams, D.F., S. Byrne, and T.A. Rado, eds. Endangered and Sensitive Species of the San Joaquin Valley, California. California Energy Commission.). Clarify the sentence.

Page 172, Western Spadefoot and California Tiger Salamander, Resource Description, paragraph 4, second sentence. The sentence states that juvenile bullfrogs are thought to compete with and prey on larvae of these native species. It would be more accurate to state that juvenile and adult bullfrogs can prey on the larvae and terrestrial forms of the species. Juvenile bullfrogs probably do not compete with the larvae of these species but rather with the terrestrial forms.

Page 172, Western Spadefoot and California Tiger Salamander, Resource Description, paragraph 4, third sentence. The sentence states that rodent control activities and development of roads are threats to the species. With respect to the former, the use of rodent burrows may be more important for California tiger salamander than for western spadefoot because spadefoots can build their own burrows if necessary. In addition, California tiger salamanders do not exclusively use rodent burrows but also use other appropriate niches. Research on the extent and necessity of burrow use by both species would be valuable. Development of roads may threaten the species if they restrict migration to the extent that population viability decreases. This may be as important an effect as direct mortality. Clarify the discussion with respect to these points.

Page 173, Western Spadefoot and California Tiger Salamander, Vision, second paragraph. The paragraph states that protecting and restoring aquatic, wetland, and floodplain habitats will be critical to the recovery of the species. These species live in natural ephemeral wetland settings like vernal pools. Recognizing this, wetland protection and restoration must focus on ephemeral pool breeders and on vernal pools or similar ephemeral wetlands in particular. Protection and restoration of other wetland habitat may not benefit these species. Similarly, restoring ecosystem processes that allow for natural floodplains and meander corridors will probably not assist in recovery of these species. Restoration of ecosystem processes that allow development of seasonal pools will likely benefit the species only to the extent that development of vernal pools or comparable ephemeral wetlands is promoted. Restate the

G-006192

vision for these species specifically in terms of protection and restoration of the habitats which they occupy (e.g. vernal pools). Cite references to support the vision (e.g. Fisher and Shaffer 1996).

Page 173, Western Spadefoot and California Tiger Salamander, Vision, paragraph 3. The first sentence refers to guidelines developed by DFG. Give a specific reference for these guidelines and note to which species they refer (i.e. western spadefoot?, California tiger salamander?, both of these?, all amphibians in California?).

Page 173, Western Spadefoot and California Tiger Salamander, Integration with Other Restoration Programs. It is unclear how general restoration and wetland management activities of these programs (especially the last two bulleted items) would specifically improve habitat for and benefit western spadefoot and California tiger salamander. See comment on Vision above. Justify the decision to include these programs.

Page 173, Western Spadefoot and California Tiger Salamander, Implementation Objective, Targets, and Programmatic Actions, paragraph 2. The sentence states that the target is to increase the population size and distribution of each species. It is unclear what is meant by "distribution" of each species. This could mean increasing the range of the species, promoting repatriations in areas formerly occupied, promoting colonization of unoccupied habitat, or something else. State specifically what is meant.

Page 174, Western Spadefoot and California Tiger Salamander, Implementation Objective, Targets, and Programmatic Actions, bulleted items. It is unclear that all of these actions would benefit the western spadefoot and California tiger salamander. As noted above, increasing wetland and riparian habitats in the Central Valley is unlikely to benefit the species except to the extent that vernal pool or similar ephemeral wetland habitat is increased. Mowing and livestock grazing are not mentioned in previous portions of the section on western spadefoot and California tiger salamander so it is unclear how actions involving them would impact the species. Reducing traffic may not be feasible. Using fumigants to control rodents only from October to March may be of little benefit to the species because, while the animals are active during those months, they return to burrows between foraging bouts and breeding activities. It would be better not to use fumigants at all where rodent burrows are important estivation sites for the species. Explain how the bulleted actions will specifically benefit these species using references to support the contentions. Additionally, make the first priority to protect existing habitat from urbanization and irrigated agriculture. Secondly, focus on improving degraded habitat (especially vernal pools in the Central Valley). Note that improved habitat must be in close enough proximity to established populations that recolonization is likely to occur.

G-006193

California Red-Legged Frog

Pages 175 through 176. The California red-legged frog will not be restored to the Central Valley or even some of the foothill areas without re-introduction. ERPP restoration actions "establishing emergent vegetation in canals, side channels, and backflow pools" in the Delta proper, will not benefit the frog. The salinity is too high in the Delta to support California red-legged frog.

The potential exists for conflicts among the CALFED Program components because many areas of favorable frog habitat are found in areas that provide the most suitable reservoir sites.

Recovery strategies for the California red-legged frog should focus on property aquisition to preserve areas where the frog is rich and to conduct detailed surveys in the western valley range and Sierran foothills for remnant populations. Service areas for water delivery in Contra Costa, Alameda, and Santa Clara counties contain appropriate areas to benefit frogs and contribute to their recovery. We note that the use of rodenticides may be in conflict with San Joaquin kit fox protection measures and may not provide benefits to the California Red-legged frog. Bull frog predation is a major concern. Focused predator management should be considered and implemented on a case by case basis in areas identified with frog populations. The implementation targets and objectives will do nothing for the frog if the frog has no way of getting to the habitats. Reintroduction on refuge lands with a predator management scheme should be considered.

Giant Garter Snake and Western Pond Turtle

Page 177, Introduction, paragraph 1. The first sentence incorrectly identifies the giant garter snake as a subspecies of the western aquatic garter snake. The giant garter snake was accorded the status of a full species, *Thamnophis gigas*, in 1987 (Rossman and Stewart).

Page 177, Introduction, paragraph 1, 2nd sentence. Include marshes, ponds, small lakes, and agricultural wetlands such as irrigation and drainage canals in the list of habitats for giant garter snakes.

Page 177, Introduction, paragraph 1, 3rd sentence. The third sentence states that most populations of giant garter snakes are found in the Feather River/Sutter Basin and American River Basin Ecological Zones. The final rule listing the giant garter snake as threatened (Federal Register Vol. 58, No. 201, p.54053-54066) identifies 13 population clusters throughout the Central Valley. These populations occur not only in the Feather River/Sutter Basin and American River Basin Ecological Zones, but also in the Colusa Basin, Butte Basin, Yolo Basin, East Side Delta Tributaries, and portions of the Sacramento San Joaquin Delta

G-006194

Ecological Zones. Historically, giant garter snakes occurred in the San Joaquin Valley, but the current status of the species in the San Joaquin valley is unknown. Include all the Central Valley ecological zones as supporting or potentially supporting giant garter snake populations.

Page 178, Integration with Other Restoration Programs, paragraph 1. The second sentence states that the American River Basin is ecologically important because it contains the most stable population of giant garter snakes. The Biological Resources Division of the USGS is currently studying stable populations of giant garter snakes that occur outside of the American River Basin. These include populations in the Colusa Basin (Sacramento and Colusa NWRs), the Badger Creek area of the Cosumnes River Preserve, and the Gilsizer Slough area of the Sutter Basin. Include these areas as ecologically important to the restoration and recovery of giant garter snakes and their habitat.

Literature Cited

Rossman, D. and G. Stewart. 1987. Taxonomic reevaluation of *Thamnophis couchii* (Serpentes: Colubridae) Occasional papers of the Museum of Zoology, Louisiana State Univ., Baton Rouge, LA No. 63. 25 pp.

Swainson's Hawk

Page 181, Swainson's Hawk, Vision. This section states that habitat restoration would achieve recovery of the hawk by increasing the quality and quantity of its habitats. While this is probably true, the quantity of hawks, *e.g.* breeding pairs, should also be increased. In order to increase the number of breeding pairs, one would need to know how many and how much habitat would need to be increased. A Recovery Plan would give specific recovery objectives and criteria for such information needs. A Recovery Team should be formed and a Recovery Plan should be prepared for the Swainson's hawk.

Page 182, Implementation Objective, Targets, and Programmatic Actions. One of the actions proposed is to "protect known nest sites from loss, degradation, or disturbance during the nesting season". However, since the hawks use the same nest trees, or surrounding trees, from year to year, nest sites should be protected year-round. The action should be revised to provide protection of known nest sites.

California Clapper Rail

Pages 183-185, California Clapper Rail (CCR). In the "Introduction" section, the ERPP states that CCRs are found in Monterey and Morro bays. Historically, they have occurred in these areas, but are now believed to no longer occur there. In the "Resource Description" section,

G-006195

the Service defines the CCR breeding season from February 1 through August 31, not from mid-March to July as defined in the ERPP. This section also states that CCRs may use "cattails and bulrushes in fresh emergent wetland habitats". CCRs are known to inhabit brackish marsh areas with alkali bulrush; however, CCR density in these areas tends to be lower than in more saline tidal salt marshes. Although limited CCR use has been documented in cattail areas and fresh emergent wetlands, these areas typically are not considered suitable CCR foraging or breeding habitat. The "Vision" section calls for the protection of "fresh emergent wetlands" in addition to saline emergent wetlands. The vision for CCRs should not include protection or restoration of fresh emergent wetlands (this change should also be made in the "Implementation Objective, Targets, and Programmatic Actions" section). From a habitat standpoint, the vision should only call for the protection and restoration of saline and brackish emergent wetlands. The more saline, the better. The vision should also call for an elimination or reduction in predation threats, especially non-native mammalian predators, to CCRs. This should also be included in the "Implementation Objective, Targets, and Programmatic Actions" section. The "Integration with Other Restoration Programs" section refers to restoration programs administered by Ducks Unlimited and California Waterfowl, and ongoing management of private duck clubs. These programs have limited, if any benefit, for CCRs, and actually could hinder restoration and management of suitable CCR habitat.

Bank Swallow

Page 194, Bank Swallow. The Corps is currently considering a comprehensive program for flood control on the Sacramento River that may include non-structural actions such as widening floodways. These possibilities should be considered under the "Integration with Other Restoration Programs" section for bank swallow vision. A similar Corps program for the San Joaquin Valley is also possible.

Protection of existing bank swallow habitat should include prevention of human disturbance in addition to the preservation of active stream channel processes cited in the document. If restoration of channel meander processes also includes restoration of riparian forest, threats to new bank swallow habitat from associated recreational development should be managed.

Salt Marsh Harvest Mouse

Pages 200-202, Salt Marsh Harvest Mouse (SMHM). In the "Introduction" section, in addition to saline emergent wetlands, SMHM are known to inhabit diked non-tidal wetlands dominated with pickleweed vegetation. Include a target for eliminating or reducing potential predation threats from non-native mammalian predators in the "Implementation Objective, Targets, and Programmatic Actions".

G-006196

Riparian Brush Rabbit

Page 203, Resource Description, paragraph 2, line 1, ". . . the riparian brush rabbit is restricted to 260 acres of remaining native riparian forest . . .". The only known population of riparian brush rabbit is found within 198 acres of Caswell State Park on the Stanislaus River. However, this acreage is further reduced by routine annual flooding.

Page 203, Resource Description, paragraph 2, last sentence. Although the population results of a January 1993 is correct, 210 to 310 individuals, subsequent surveys following the January 1997 flood indicate that this species may be close to extinction. No brush rabbits were trapped in 22 nights of trapping between April 21 and May 30, 1997. Two sightings and signs of rabbits at four locations were found. While it is evident some number of rabbits survived the flood event, the current population size is unknown. The riparian brush rabbit is considered the most sensitive mammal in California because of its susceptibility to floods, disease, predation, human disturbance, and flood control activities. Restoration of habitats is critical to the recovery of this species.

Page 204, Integration with Other Restoration Programs. The document incorrectly states that there are no current programs aimed at restoration of the riparian brush rabbit. A draft San Joaquin Recovery Plan has been developed which includes specific measures for the riparian brush rabbit. In addition, under the CVPIA, Section 3406(b)(1) an interagency task force with representatives from the Bureau of Reclamation, the Fish and Wildlife Service, the California Department of Fish and Game, California Department of Parks and Recreation and the San Joaquin Valley Endangered Species Recovery Program met on June 26, 1997 to coordinate activities and to initiate the development of plans to reestablish rabbit and riparian woodrat as quickly as possible. Christman Island, part of the San Joaquin River National Wildlife Refuge, was identified as the greatest potential for restoration. The group also agreed to work together to identify one or more other sites on public property along the San Joaquin River in Merced County for restoration and reestablishment of a third population of the two species. The ERPP should incorporate the conservation strategy and conservation actions from the draft San Joaquin Recovery Plan and should coordinate activities with the activities of the CVPIA restoration program.

Page 204, Linkage with Other Ecosystem Elements. The document identifies restoration of habitats as important but does not provide a discussion on methods to restore these habitats. One method would be to create refugia in the event of flooding, plant trees and shrubs, monitor the created habitat, and conduct population index work to see if rabbits are living in restored areas. The document should discuss methods to restore the habitats.

G-006197

Page 205, Implementation Objective, Targets, and Programmatic Actions. This section discusses reducing conflicts. Property acquisition through conservation easements and/or in fee will provide the most protection for the rabbit. Quantitative targets will need to be developed and existing and restored areas monitored. A miniature habitat management plan of one or two pages should be developed to answer the who, what, where, when, why, and how questions. Use of GIS information will be helpful for achieving all conservation goals.

Waterfowl

Page 211, Waterfowl, Implementation Objective, Targets, and Programmatic Aactions, paragraph 1. Recommend changing objective to: "The implementation objective for waterfowl is to maintain healthy populations at levels that can support both consumptive and nonconsumptive uses consistent with the goals and objectives of the Central Valley Habitat Joint Venture and the North American Waterfowl Management Plan, and contribute to the overall health and beneficial uses of the Bay-Delta."

Upland Game

Page 212, Upland Game. The vision for upland game has the opportunity to look across multiple habitat types and provide for restoration, enhancement, and protection at a landscape level. It is one of the few visions that does not emphasize single species and habitats. The vision's description and action statements could emphasize the importance of contiguous, multiple habitat landscapes to ecosystem level restoration (e.g., riparian-grassland-woodland-wetland complexes). Other restoration programs (e.g., riparian restoration) can be integrated in addition to game oriented programs.

Neotropical Migratory Bird Guild

Page 215, Neotropical Migratory Bird Guild. The neotropical migrant vision is very vague. The implementation objective should be to increase, and not only "maintain", healthy populations. This would require increasing the productivity and survival of neotropical migrants as well as their populations and ranges. It is unclear how the programmatic action of increasing agricultural habitat in the Central Valley will help meet the implementation objective. Conversion of native habitat to agricultural land is one of the main causes of neotropical migrant declines and is in not better than native habitat. Furthermore, increasing agricultural lands conflicts with natural ecosystem restoration and protection. It is also unclear what improving upper watershed health entails, or what detrimental conditions would be addressed. More detail is needed for how specific nesting habitats would be improved. The document should address management of habitat fragmentation and protecting nesting habitat from predators and human disturbance.

G-006198

The vision for neotropical migrants also has the opportunity to look across multiple habitat types and provide for restoration, enhancement, and protection at a landscape level. It is one of the few visions that does not emphasize single species and habitats. The vision's description and action statements could emphasize the importance of contiguous, multiple habitat landscapes to ecosystem level restoration (e.g., riparian-grassland-woodland-wetland complexes). A study area-wide plan is also needed to properly protect large blocks of habitat that would minimize the detrimental effects of fragmentation (e.g., creation of excessive habitat edge favored by nest predators and parasites, and isolation of populations). Because neotropical migrants are present in California only about half the year, establishment of mechanisms for ERPP to support the international Partners in Flight program (which addresses habitats and land management in the birds' wintering grounds) is also needed. Full benefits of improvements to California habitat will not be realized if the birds are not surviving the wintering period in South and Central America

Page 216, Neotropical Migratory Bird Guild. We recommend that a list of Neotropical species be added to the report either here or as an appendix.

Lange's Metalmark, Delta Green Ground Beetle, and Valley Elderberry Longhorn Beetle

Valley Elderberry Longhorn Beetle (VELB). The American River Parkway is not a good area for restoring beetle habitat by planting elderberry shrubs and restoring riparian areas because the parkway is well vegetated and has numerous elderberry shrubs. However, restoring portions of the Sacramento River and tributaries into the Sacramento and San Joaquin rivers would do more for the beetle. Riparian restoration along portions of Putah Creek and the Merced River would benefit the beetle. Add Arundo sp. to the list of exotics within the document. Arundo (giant reed) is a big problem for the beetle in areas where it excludes elderberry colonization.

Lange's Metalmark Butterfly (LMB). All actions that will preserve and maintain the remnant inland dune area within Antioch are beneficial for the Lange's Metalmark butterfly. The problem is stabilization of the sand by weedy exotics which has resulted in the loss of the butterfly's food plant. There may still be the potential to restore some inland dune habitat to the east of Antioch (Oakley). This would be a very beneficial for the highly endemic species found on the Antioch preserve. These remaining sandy areas along the railroad corridor in Oakley have become very stabilized with vegetation.

Delta Green Ground beetle. The document is unclear about what types of habitats would be created to restore this beetle. The beetle uses both the upland areas and the water's edge

depending on time-of-year. The vision for this species should be to restore both types of habitats.

Page 217, first sentence and page 219. The delta green ground beetle is listed as threatened, not endangered.

Page 217, Resource Description, paragraph 1. The Lange's Metalmark is also found on PG&E parcels that flank the eastern unit of the Antioch Dunes National Wildlife Refuge (not "Antioch Dunes Ecological Reserve" - also on p. 219). Fifteen acres of habitat may be an underestimate: total area of the Refuge and PG&E parcels is about 70 acres. There is considerable population data on the species since the 1977 estimate cited. For example, Richard A. Arnold's annual report of January 15, 1986, to the Refuge indicated a slight increase in the population of the butterfly since 1977. From 1986 to 1991, the population increased exponentially, from approximately 160 butterflies counted in 1986 to nearly 2000 butterflies counted in 1991. In 1992, the population fell to about 1/3 of the previous year's peak level, but by 1996 had recovered to in excess of 2000 butterflies counted on the Refuge and the adjacent PG&E parcels. Estimates for 1997 are still being processed but were well in excess of 2000 butterflies.

Gravel mining is listed as a stressor for the species; this should instead say "sand" mining.

Page 217, Resource Description, paragraphs 2 and 3. This section inaccurately describes delta green ground beetle habitat as restricted to "moist environments" or vernal or playa pool edges. Actually, biologists who have worked with the species note that, while this is where the adults are most easily observed, the extent to which they also use the surrounding grassland is unknown. The habitat requirements of the larvae are almost entirely unknown, but they are certainly not aquatic. The Service believes that the "grasslands" surrounding vernal pool complexes in southern and central Solano County and southwestern Sacramento County should also be considered delta green ground beetle habitat.

The text states that only 75 delta green ground beetles have been seen since 1974. Does this include the extensive reports of Larry Serpa and Richard Arnold? Provide a reference for this number and/or correct it if necessary. Add "encroachment of invasive non-native plants" to the list of threats to the species.

Page 218, Vision, paragraph 3. Add "controlling invasive non-native plants" to actions critical to recovery.

Page 218, Vision, paragraph 4. The Jepson Prairie Preserve may be transferred from TNC to state or county control. Update this paragraph and subsequent references.

Page 219, Linkage with Other Ecosystem Elements. Modify "wetland" to say "seasonal wetland". (Also in last bullet of first column). Add a bullet making "Control invasive non-native plants that threaten sensitive habitat" an objective.

Regarding the bullet that says "Reduce the adverse effects of fences or other structures that can impede dune formation": there are few alternatives to some fences, nor are fences and structures the only factors that impede dune formation. Revise to say "Enhance the formation of active dunes, by such means as importing clean sand of appropriate dimensions, reducing stabilizing vegetation, and increasing topographic relief, dune height, and the frequency of steep north/northwest facing erosional slopes with sparse vegetation cover (blowouts, erosional scarps). Steepened dunes should be encouraged to remain erosional and mobile."

Local ordinances already mandate the maintenance of firebreaks, and improper use of firebreaks could harm Lange's metalmarks as well as Antioch Dunes evening primroses, Contra Costa wallflowers, and a variety of insect species of concern. Therefore we recommend deleting the bulleted item that starts "Establish buffers, such as firebreaks...".

Modify "beetle" to say "delta green ground beetle" in the next bullet, which begins "Design and manage restored seasonal wetlands...".

Please provide references for this section.

VISIONS FOR REDUCING OR ELIMINATING STRESSORS

Page 220, Visions for Reducing or Eliminating Stressors. Detrimental effects of habitat fragmentation are discussed in several parts of the ERPP. Fragmentation of habitats is one of the most important factors stressing ecosystems within the Central Valley and Bay-Estuary. Much discussion centers on riparian forest, but other communities, such as valley foothill hardwood, coniferous forest, and grassland/pasture land, are also affected. Future increases in water supply and diversions will lead to fragmentation-inducing development within these communities, especially in the foothills region. Planning and management of such developments must be sensitive to the problems of fragmentation if adverse impacts to the ecosystem are to be minimized. Therefore, habitat fragmentation, in itself, should be included as a stressor under ERPP, and objectives, targets and programmatic actions should be developed by the program to minimize its adverse effects. Strategies to maintain large blocks of habitat with connecting corridors and minimize disturbance and harassment would be appropriate. The size of habitat blocks and corridor widths should be determined. Spatial aspects, in particular, for the study area ecosystem are not discussed comprehensively elsewhere in the ERPP.

Page 220, Table 11, Implementation Objective, Water Diversions. When reducing entrainment of juvenile fish is mentioned, a global change throughout the document should be made to include "reducing entrainment of all life stages of fish into water diversions.

Page 224, Table 13. This table is also incomplete. Boat docks and predatory fish are also a result of human made structures. See attached Table 13 for recommended additions.

Water Diversions

Page 225, Water Diversions, paragraph 2. States that water diversions indirectly affects habitat. Water diversions also affect habitat directly. For example salinity zones in estuaries are habitat for many water column organisms, especially planktonic. Water diversions can affect salinity patterns. Also river flow which can be affected by diversions, is a critical habitat characteristic for delta smelt. Change to "Water diversions directly and indirectly affect habitat."

Page 225, Stressor Description, paragraph 2. Include a 4th bullet: Stating smaller agriculture diversions exist as well as the large diversions.

Page 225, Water Diversions, Stressor Description, paragraph 3, "The largest diversions have fish screens but the screens require high maintenance. Consequently, fish screen have only limited effectiveness and require costly retrofits to improve screening efficiency". The "largest diversions" is too broad. Red Bluff Diversion Dam and Glenn-Colusa's Hamilton City Pumping Plant are the two largest diversions on the Sacramento River. Sutter Mutual and Reclamation District 108 are both "large diversions" that currently lack fish screens. A properly designed and built fish screen requires routine maintenance rather than high maintenance. The effectiveness of fish screens is dependant on many factors, including maintenance, design, and site-specific physical conditions. A well designed fish screen based on proven technology is effective in reducing entrainment and impingement losses of many species of juvenile fish. Screen retrofits can be fairly inexpensive, especially on smaller sized diversions.

Page 225, Water Diversions, Introduction, paragraph 2. The last sentence of the paragraph implies an inaccuracy. Recommend the sentence be changed to, "The rate of diversion from the Delta affects residence time of water which, in turn, affects primary (plant) and secondary (animal) production."

Page 225, Water Diversions, Introduction, paragraph 3. Recommend that the changes indicated in italics be made to the original text. "Factors that relate to the influence *that* diversions have on the *health of the* Bay-Delta*'s* ecosystem include diversion rate, the season

G-006202

in which water is diverted, the diversion location, and whether the diversion is equipped with adequate fish protective facilities."

Page 225, Water Diversions, Introduction, paragraph 4. For greater accuracy that can be supported, we recommend the following wording change, "...juvenile and adult fish; however, eggs and larval fish, invertebrates, planktonic plants, organic debris, and dissolved nutrients...".

Page 225, Water Diversions, Stressor Description, paragraph 3, line 5, "The larger diversions . . . are screened with fine-mesh screens." The adequacy of fish screens should focus on meeting NMFS and CDFG screen criteria rather than being of a fine-mesh.

Page 225, Water Diversions, Stressor Description, paragraph 2. Changing the first sentence as follows will indicate why the "bulleted" diversions were identified. "Along the mainstem Sacramento River some of the larger diversions are:" Then after the three bulleted diversions need to insert "which" as follows, "The Red Bluff diversion Dam (RBDD) which ....". In the second bulleted item also recommend the following wording change "...ACID Canal and like the above named canals diverts water from the upper river."

Page 226, Vision, paragraph 1. Reducing water diversions will also assist in improving fishery habitat.

Page 226, Vision, paragraph 2. Include delta smelt and splittail since these are listed and proposed species.

Page 226, Water Diversions, Vision, paragraph 6, "The Red Bluff Research Program is studying alternatives, including pumping from the river without returning entrained salmon and steelhead through a bypass system." The Research Pumping Plant at Red Bluff Diversion Dam diverts both water and fish via Archimedes or internal helical pumps. Fish are screened and returned to the river via a bypass system.

Page 226, Water Diversions, Vision. The discussion on water diversions focuses on the entrainment of organisms by screens. In addition, this should discuss all aspects of water conservation and demand management, contaminants with regard to dilution flow requirements, and operational changes in timing.

Page 226, Water Diversions, line 9. Recommend adding the underlined as follows, "...more are lost to handling, predation, and to bypass inefficiency..."

G-006203

Page 226, Water Diversions, Vision, paragraph 2, line.4. Delete "and aquatic plants" from "... and many other fishes and aquatic plants and invertebrates..."

Page 226, Water Diversions, Vision, paragraph 3, line 3. Add "s" to diversion.

Page 226, Water Diversions, Vision, paragraph 3, line 4. Add "some" to "...timing of [some] diversions..."

Page 226, Water Diversions, Vision, paragraph 4. Recommend that the following underlined changes be made to this paragraph. "On much of the Sacramento and San Joaquin rivers and their tributaries, diversions entrain juvenile salmon and steelhead in spawning and rearing areas, and on their migrations downstream toward the ocean. Adequate positive barrier fish screens will protect juvenile salmon and steelhead from being entrained. Positive barrier fish screens can be employed at most diversion sites."

Page 226, Water Diversions, Vision, paragraph 5. Recommend deletion of this paragraph since with changes recommended above, this paragraph becomes redundant.

Page 227, paragraph 3. last sentence. Recommend updating this sentence via the following changes. "In Suisun Bay and Suisun Marsh, use of either positive barrier flat screens or conical screens on slough intakes has proven effective."

Page 227, Integration with Other Restoration Programs, paragraph 2, first sentence. Change "with other screening programs" to "among several agencies' screening programs including DFG's Unscreened Diversion Program, the Anadromous Fish Screen__ Program ... ."

Page 227, Integration with Other Restoration Programs, paragraph 2, second sentence. Recommend deletion of Sutter Mutual diversion since it is incorrect; modify the sentence as follows: "Reclamation Districts 108 and 1004, and Princeton-Codora-Glenn/Provident Irrigation District and other large diverters are either installing new screens or have begun the engineering needed to install screens." Follow this with the sentence starting "Hundreds of smaller...", then return to the sentence that originally started with "Under..." and change sentence to, "The CVPIA Anadromous Fish Screen Program will contribute to the screening of most, if not all, of these diversions." and finish with the unchanged last sentence of the paragraph.

Page 228, Implementation Objective, Targets, and Programmatic Actions, paragraph 2 "The general target is to reduce the adverse effects of water diversion . . ." Screening water diversions may not be an adequate action by itself to restore ecological health. While it helps

G-006204

address entrainment effects, it does not improve the effect of the diversion of water on the natural hydrograph and other ecological processes.

Page 228, Implementation Objective, Targets, and Programmatic Actions, "Install positive barrier fish screens on all diversion of more than 250 cfs . . .". The 250 cfs size limitation seems too large. Many of the unscreened diversions on the Sacramento River are below this size. Diversions less than 250 cfs will continue to entrain fish and result in cumulative losses. At the very least, the ERPP should discuss the benefits of installing positive barrier fish screens on diversions of different sizes.

Page 228, Implementation Objective, Targets, and Programmatic Actions, 1st bullet. Delete "Implement" and add following wording, "Widen the area of concern of the Anadromous Fish Screen Program's multi-agency policy level and management team for unscreened diversions, which is composed of ..."

Page 228, Implementation Objective, Targets, and Programmatic Actions, 2nd bullet. Revise to read, "Finish the development of the priority system to install positive barrier fish screens on diversions in the upper Sacramento River and in tributary streams..."

Dams, Reservoirs, Weirs, and Other Human-made Structures

Page 228, Implementation Objective, Targets, and Programmatic Actions, 7th & 12th bullets. Recommend replacing the actions addressed in these two bullets with: "Develop a priority system to install positive barrier fish screens on diversions based upon criteria indicative of impact to the fish populations of concern."

Page 229, Introduction, paragraph 2, 1st sentence. Recommend the following underlined wording change, "Diversion dams exist throughout the watershed of the Sacramento-San Joaquin rivers and Bay-Delta

Page 229, Introduction, paragraph 2, second sentence. "Bypasses" should be in lower case letter.

Page 229, Stressor Description, paragraph 3, second sentence. "... passage, many are technologically outdated and ___ only marginally effective.

Page 230, Vision, paragraph 3, third sentence. This sentence does not make sense as written; Recommend the following change: "The feasibility of restoring anadromous fish above some of these dams _____ may be considered in the future."

G-006205

Page 231 Implementation Objective, Targets, and Programmatic Actions, paragraph 2, first sentence. Add "s" to "dams"

Levees, Bridges, and Bank Protection

Page 233, Levees, Bridges, and Bank Protection, Vision, paragraph 2, first sentence. The value of habitat nodes is dependent on the size, location, type of habitat, etc.

Page 233, Levees, Bridges, and Bank Protection, Vision, paragraph 2, second sentence. General statements regarding setback levees within the Delta island system should be evaluated on a case-by-case basis.

Page 234, Levees, Bridges, Bank Protection, Integration with Other Restoration Programs. Please define and describe the AB-360 program.

Page 235 Implementation Objective, Targets, and Programmatic Actions, Bullets. Add : Tier from on-going programs to contribute to successful implementation.

Dredging and Sediment Disposal

Page 236, Stressor Description, paragraph 6. Add agricultural sustainability to the list of things that dredging material is needed for.

Gravel Mining

Page 241, Gravel Mining, Vision, paragraph 2, line 2,"...reducing or eliminating instream gravel extraction". Remove "reducing or".

Page 241, Gravel Mining, Vision, paragraph 2, line 3, "....by relocating gravel mining.....outside active stream channels...". Mining sites should be located out of riparian areas, particularly the lower terrace of riparian zones.

Invasive Aquatic Organisms

Page 251, paragraph 6, line 8, "Although these crabs. . . effect on levees.". Please provide the reference.

Non Native Wildlife

Page 263, Visions for Reducing or Eliminating Stressors, Non-Native Wildlife. Because habitat fragmentation is an important cause of the spread and increase in non-native species, and some problem areas are known, it should be possible to be more specific in recommending establishment of large habitat blocks. This should be listed as an action/activity along with the others in that section, and not be only a general target. For example, identify the size (width) of habitat blocks necessary and the general locations where they would be most productive.

Although detrimental to open-cup nesting bird species, it should be noted that brown-headed cowbirds are not technically a non-native species. Their range in California may have expanded since European settlement, but so have many other California species that we do not call non-native. Perhaps detrimental effects of this species could be discussed along with jays, crows, magpies, and possibly other terrestrial species, in a new terrestrial section under the Predation and Competition Stressor Vision.

Predation and Competition

Page 266, Visions for Reducing or Eliminating Stressors, Predation and Competition. The Predation and Competition stressor vision addresses only aquatic habitats. Terrestrial communities also face ecosystem imbalances due to habitat alteration. For example, nest predation of birds is discussed under the Non-Native Wildlife stressor vision, but predation and parasitism by native species is also an important stressor. Habitat fragmentation, especially in riparian forest, has produced a greater abundance of edge and open forest favored by nest-parasitizing cowbirds and nest-depredating corvids (yellow-billed magpies, crows, and scrub jays).

Contaminants

Page 275, Contaminants, Introduction, paragraph 2, first sentence. Change "protected" to "improved".

Page 275, Contaminants, Stressor Description, paragraph 2. Add that salinity alone, dependent on location and species of concern, can have adverse ecological effects.

Page 276, Contaminants, Stressor Description, first full paragraph. Add trihalomethanes and selenate compounds, which are biologically significant.

Page 276, Contaminants, Stressor Description, paragraph 7, second sentence. Delete "may".

Page 277 and 278, Contaminants, Vision. In general, a proactive approach is not reflected in this section. We recommend that CALFED provide funding as incentives and to implement source control measures.

Page 278, Contaminants, Integration with Other Restoration programs, paragraph 2, first sentence. The geographic scope includes all areas in the state which affect Bay/Delta water quality.

Page 278, Contaminants, Integration with Other Restoration programs. Change "may" to "will".

Page 278, Contaminants, Integration with Other Restoration programs, paragraph 3. CALFED should function as a clearing house to facilitate Bay/Delta improvements.

Page 279, Contaminants, Implementation Objective, Targets, and Programmatic Actions. Consider incorporating the following elements:

- providing funding to initiate implementation of the State Land Retirement Program.
- recommending that the Federal (CVPIA) Land Retirement Program reduce water allocations if lands are retired.
- providing funding for water reclamation projects and tertiary treatment plants.
- functioning as a clearing house to coordinate Bay/Delta improvements.

Artificial Fish Propagation

Page 291, Visions for Reducing or Eliminating Stressors, Artificial Fish Propagation. Although the section of the CALFED Ecosystem Restoration Program Plan (ERPP) covering Artificial Fish Propagation is fairly complete, we are providing comments with suggestions to improve the document.

Page 291, Visions for Reducing or Eliminating Stressors, Artificial Fish Propagation, Stressor Description, paragraph 2, line 6. Change "15 million" to "33 million."

Page 291, Visions for Reducing or Eliminating Stressors, Artificial Fish Propagation, Stressor Description, paragraph 3, line 9 and Page 292, paragraph 2, line 8. The citation "Waples 1991" refers to a publication on page 295 titled Genetic methods for estimating the effective size of cetacean populations. Pages 279-300 in Report of the International Whaling Commission, Special Issue 13. Is this a correct citation? If so, explain how mammalian research may be applied to pacific salmonids?

G-006208

Pages 291 through 293, Artificial Fish Propagation, Stressor Description. Under the section Stressor Description, the "stressors" that hatchery produced fish may pose on wild/natural stocks have been identified in a number of documents. Stewart and Bjornn (1990) have categorized these stressors as being either genetic (e.g., inbreeding and outbreeding) or ecological (e.g., competition, predation, and displacement). We recommend the ERPP more specifically list and briefly describe the stressors as done in Stewart and Bjornn (1990), or refer the reader to that document. We also recommend that consideration be given to Hard et al. (1992) when referring to potential genetic risks, as this document presents guidelines to minimize genetic risks associated with artificial propagation. Potential genetic impacts of hatcheries and hatchery fish are also fully discussed in Campton (1995). We recommend this citation also be included in the ERPP, not only to describe the potential genetic risks but also to act as a balance, since Campton argues that empirical data supporting the conceptual arguments of direct genetic effects are absent or largely circumstantial.

The Stressor Description also contains a lengthy discussion of the potential to over-harvest natural stocks as a result of hatchery production. While this is true, it should be noted that this is not a problem with hatchery production in and of itself. Instead, it is a problem of harvest management, and should be fully addressed in the "Harvest" section of the ERPP. Interestingly, one of the "targets" for artificial production as presented in the "Artificial Production" section states that "all artificially propagated fish should receive identifiable marks." The benefit of the recommendation, however, is not explained in the general text. If it is related to the harvest management paragraphs then it needs to be noted that even if all hatchery fish are marked, selective harvest may still result in unacceptable hooking mortality rates on wild natural stocks. Therefore, the rationale and the circumstances for complete marking should be more thoroughly explained in the body of the text before its presentation as a goal or target.

Information presented on hatchery fish escapement to the Feather and American rivers is confusing, as the two percentages presented are so very different (i.e., Feather River 26% average for 1975-1987 and 78% average for 1975-1984). The CALFED document does indicate that these two figures come from different sources, but makes no effort to explain the radical difference between the two values. This difference should be explained.

Page 293, Visions for Reducing or Eliminating Stressors, Artificial Fish Propagation, Stressor Description, lines 1 through 5. This sentence states "In the Central Valley, two hatchery practices in particular might contribute to elevated straying levels: trucking smolts and yearlings to distant sites for release and transferring eggs and young fish between hatcheries." These are practices at both Nimbus and Feather River hatcheries, but neither are practices at the Coleman National Fish Hatchery. The document should be revised to more clearly indicate where these potential problems may occur.

Page 293, Visions for Reducing or Eliminating Stressors, Artificial Fish Propagation, Vision. There are many factors affecting wild stocks that are not part of the natural ecosystem process such as the GCID, SWP and CVP diversions that interfere with natural migratory period. Wild stocks are not likely to fully recover until all diversions have been adequately screened.

Page 293, Integration with other Programs. Mention is made of NMFS's obligation under ESA to develop a recovery plan for winter-run chinook salmon. The CALFED document should note that a draft recovery plan was distributed on August 6, 1997. The public comment period on this document extends through December 7, 1997.

Page 294, Linkage with other Ecosystem Elements. The document categorizes steelhead as "a species of concern." On August 9, 1996, NMFS published a proposed rule to list ten Evolutionarily Significant Units of west coast steelhead as threatened or endangered under the ESA. Included in this proposed rule was a proposal to list the Central Valley stock of steelhead as endangered. On August 11, 1997, an announcement was made by NMFS to defer the listing decision for Central Valley steelhead for a period of six months due to scientific disagreement about the status of the stock. Although steelhead are considered a "species of concern" by the State of California, the Federal listing activities and process should also be noted in the CALFED document.

References

Campton, D.E. 1995. Genetic effects of hatchery fish on wild populations of Pacific salmon and steelhead: what do we really know? American Fisheries Society Symposium 15:337-353.

Hard, J.J., R.P. Jones, Jr, M.R. Delarm, and R.S. Waples. 1992 Pacific salmon and artificial propagation under the Endangered Species Act. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-NWFSC-2, 56 p.

Steward, C.R., and T.C. Bjornn. 1990. Supplementation of salmon and steelhead stocks of salmon and steelhead supplementation, Part 2. Report to Bonneville Power Administration (Project 88-100).