January 10, 1997. USFWS staff comments following review of the Preliminary Working Draft, CALFED Bay-Delta Program, Ecosystem Restoration Program Plan (ERPP), Implementation Objectives and Targets, dated November 15, 1996.

The Fish and Wildlife Service has completed review of the document titled Preliminary Working Draft, CALFED Bay-Delta Program, Ecosystem Restoration Program Plan (ERPP), Implementation Objectives and Targets, dated November 15, 1996. In general, the plan is reasonably organized and contains a large amount of information attempting to cover all areas of concern with goals and objectives which are positive for the ecosystem. Your staff and consultants are to be commended for producing this document with the constrained time frame.

Because much of the information is very general, we found specific comments difficult to make. In addition, we are concerned that without the document specifying when, where, and how much of what will be implemented, an attractive package may be produced which may not result in substantive benefits to the natural environment. However, we are committed to development of the CALFED Bay-Delta Program (Program) and are submitting the following comments, which address problem areas in the document, to assist you and your staff in refing this important component.

General Comments

Geographic Scope. The Delta ecosystem can not be separated from the Central Valley and San Francisco Bay ecosystems. Our understanding is that no restoration actions are proposed for several species which have historically been affected by actions in the Sacramento-San Joaquin Delta (Delta). These include, but are not limited to, the San Joaquin kit fox, blunt nosed leopard lizard, the giant kangaroo rat and numerous San Joaquin plant species. The historic effects of the diversion of water from the Delta on the semi-arid ecosystem have not been addressed. Species which are adapted to desert or semi-arid climates have been affected in numerous ways by the introduction of a regular water source. Increased agricultural, rural, urban and industrial development, and mineral extractions have all led to loss of habitat and habitat degradation and fragmentation. Water conveyance systems also act as barriers to species dispersal and migration. A regular water supply has allowed the invasion of exotic plant and animal species which are harmful to native species, such as the red fox which predates on kit fox. These species and habitats are part of the ecosystem that has been and will continue to be affected by water withdrawals from the Delta either directly or indirectly. The ERPP should provide restoration actions for these species so that the program may meet its stated needs in the other program elements of water supply reliability, water quality, and system vulnerability.

Some actions proposed in the ERPP to benefit some species may affect other listed species that are not included in the plan. For instance the direct effects of the plan on kit fox and other listed burrowing animals such as the tipton kangaroo rat, Fresno kangaroo rat, giant kangaroo rat, and the blunt-nosed leopard lizard are difficult to assess. However, we can surmise that any levee

manipulation may adversely affect kit foxes which routinely den in levee areas or flooding of agricultural fields for waterfowl may flood areas used by kit fox for foraging.

The area mapped for implementation of solutions stopped at the north boarder of Fresno County and did not extend to the southern reaches of the San Joaquin Valley, even though water from the Delta may be used to farm the west side of the Valley as far south as Kern County. Restoration targets should be extracted from the recovery plan(s) to include restoration efforts such as land retirement, land restoration, managed grazing, decreased use of insecticides/rodenticides/herbicides, red fox removal, building or maintaining culverts as dispersal structures, and others.

We strongly recommend that the CALFED Team and its consultants reevaluate the scope of restoration and include the species discussed above and their semi-arid habitats in restoration efforts. In addition, the San Joaquin River from Friant Dam to the Merced River confluence should be included, for, as a minimum, non-fisheries restoration actions associated with riparian habitat and riparian-dependent species.

In addition, the document can be improved by defining sphere of influence of the Program. Two maps make up Figures 1 and 2, the Problem Scope and Solution Scope, respectively. However, discerning where restoration efforts will occur is difficult. Will efforts be limited to the area defined as the Problem Scope area in Figure 1? Or will restoration efforts also take place throughout the Solution Scope area of Figure 2? Will the entire area(s) be included or just specific portions (e.g., all wetland habitats, just riparian habitats)? The document should thoroughly define the sphere of influence of the Program and specifically address why each choice was made to help define what plant and animal species and habitat types need to be considered as the plan is developed.

The Ecosystem Restoration Program as presented in this document does not attempt to restore the Bay-Delta ecosystem which would extend throughout the watershed, but rather a subset of the Bay-Delta ecosystem. The ERPP should be revised to include restoration actions for all areas which have been or will be affected by actions occurring in the Delta. These actions could include species that occur within the San Joaquin and Sacramento Valleys, as well as the Sierra foothills. An example of the broad effects which can occur within a program such as the CALFED Bay-Delta Program may be found in the Biological Opinion for the Interim Contract renewals (copy enclosed). Failure to address these areas may affect the reliabililty in the other Program problem areas -- water supply reliability, water quality, and system vulnerability.

Rationale. Many of the quantitative targets seem arbitrarily chosen. The report should identify which quantitative targets are based on sound biological information related to achieving targets, and which are best professional guesses. At this stage, it would be preferable to avoid best guesses, or if deemed necessary, provide a range which encompasses values that are conservative from a biological resource perspective such as "reduce by 50-90%". Targets which reduce/increase populations by 10% (e.g., B3 in Table 10, pg. 52), are often meaningless because

rarely can one detect population changes of 10%, without extremely intensive sampling. In addition, a 10% reduction/increase (e.g., for introduced nest-predators) would not likely provide significant benefits. The targets within the ERPP should be more ambitious, and unless population numbers are known, targets should not be written in terms of percentages.

As written, the document specifically mentions target plant and animal species. However, the document does not address why these species were chosen and others excluded. We are particularly concerned how the choices were made to include the 15 plant species given that six counties in the Problem Scope Area (Contra Costa County [CCA], Sacramento County [SAC], San Joaquin County [SJQ], Solano County [SOL], Stanislaus County [STA], and Yolo County [YOL]) contain 68 special status plant species that are federally listed, proposed for listing, candidate plant species, and/or plant species of concern. The additional 11 counties of the solution area contain 130 more special status plant species. We have enclosed copies of these lists for your convenience . Consideration should be given to identify which of the species should to be included in the planning process and which need not be considered. This decision will likely be based, at least in part, on decisions made regarding the sphere of influence of the project (see above). In addition, we noted that some of the target species included in the plan are relatively common species (e.g., small spikerush, CNPS List 4). These choices need to be explained and justified. Are there other relatively common species that should to be considered as well?

We are concerned about the absence of vernal pool plants from the plan. Although the plan addresses the increase and enhancement of vernal pool habitats for animal species (e.g., Table 11, p. 3) it neglects at least eight vernal pool plant species within the problem scope area which are federally listed or proposed for listing.

The planning effort should be broadened and improved by providing more specific definition of plant community types which are to be considered in the Problem Scope and Solution Scope areas. As it is, the plant associations and plant community types are insufficiently characterized. It is not clear from the document which plant communities (or vegetation types) are considered, which are excluded, and why. For example, although riparian vegetation is mentioned a number of times throughout, the document is unclear about the specific type(s) of riparian vegetation is(are) being considered. Because a number of types of riparian vegetation have been defined in the Holland classification and in Sawyer and Keeler-Wolf, it is appropriate and useful to be specific in discussions of riparian vegetation restoration. We recommend planning based on specific and scientifically defensible community types. Choosing one of the available community classification schemes for California and using it consistently would provide clarity and defensibility to the plan. This approach would also lend itself to consideration of rare community types which occur within the project area.

Level of Detail. We continue to be concerned that the level of detail contained in the plan will be insufficient to allow evaluation of the effects of the Program in the Environmental Impact Statement/Environmental Impact Report (EIR/EIS). Producing a plan with comprehensive and

detailed classifications of habitats, species and species groups, and restoration concepts is relatively easy. However, the difficult part is drawing up actual restoration plans that include specific locations and acreages. Without these details, the plan may not produce real benefits to the natural environment.

When developing the quantitative and site specific details, the following items will need to be considered and the rationale used for decisions documented: 1) priorities for restoration elements, 2) relative proportions of habitat areas to be addressed with restoration actions, while considering interactions and dependencies among the different elements, and 3) spatial arrangement of restoration sites considering the interactions and dependencies, again. Once this information is developed, critical evaluation of the Program will be easier.

Even though the analysis in EIS/EIR associated with the Program will be programmatic in nature, much more detail in the ERPP will be necessary in order to evaluate the effects of the Program on fish and wildlife and their habitats. The ERPP should be as detailed as possible to facilitate impact analysis, including more information identifying references and explaining how existing restoration plans and documents for the region were used to develop the objectives and targets.

Baseline year for Habitats and Species. Table 8 states that a target of the CALFED Program is to emulate hydraulic conditions present in the Bay-Delta under mid-1960s level of water supply development. CALFED should also establish a target baseline year for habitats and species. The document makes repeated use of statements such as "reestablish desirable levels", "reduce populations of____", and "increase _____habitat" type, without first establishing the extent and level of habitat or population numbers in the historical past, or the future needs to "sustain populations" of native fish and wildlife species. Without establishing exactly what is needed to protect or enhance existing populations of fish and wildlife, establishment of management objectives and the selection of solutions is premature.

Revision of Program Objectives. The Ecosystem Quality Objectives have been used as the basis under which all Implementation Objectives and Targets must fit. However, Objectives which are essential to ecosystem restoration are missing. Other CALFED documents stress the importance of protecting and restoring the natural processes which underlie ecosystem and habitat health and function. This is appropriate, and consistent with ecosystem restoration science. However, the current version of the Ecosystem Quality Objectives fails to explicitly acknowledge or address important natural processes at the ecosystem level, or to include objectives which target the restoration of critical natural processes. To use the CALFED medical analogy, the CALFED Objectives admirably treat the plethora of symptoms of a failing Bay-Delta ecosystem, but fail to address the underlying systemic illness. If true ecosystem restoration is to be achieved, it is essential for the Ecosystem Quality Objectives to identify and target those underlying problems. A clear first step is to include Ecosystem Quality Objectives which explicitly address the protection and restoration of those failing natural processes which sustain the Bay-Delta ecosystem and its different habitats and species. While Implementation Objectives and Targets later in the document do address processes and functions, it is important that the fundamental set

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of objectives, the CALFED "Ecosystem Quality Objectives", also do so.

In addition to addressing specific needs of species and habitats, underlying problems at the ecosystem level must be fixed so that the solution which CALFED produces is not a complex set of structural or high-technology actions, which may provide local benefits, but do not remedy underlying causes of ecosystem degradation. We are concerned that a restoration plan which emphasizes technological/structural restoration actions will require ongoing intervention/maintenance to maintain resource benefits fish and wildlife. Perpetual intervention requires continued interest and funding for maintenance without which mitigation fails as we have witnessed and documented. A restoration plan which reestablishes critical natural processes to a level which sustains an ecosystem may require a greater initial effort, but have greater long-term chance for success, since these natural processes will maintain the restored systems.

Hatcheries. We continue to recommend against hatcheries as a means to improve fish production. If the goal of the Program is ecosystem restoration, it should be done without supplemental production from hatcheries. Hatchery produced fish often compete with natural fish for spatial habitat and may complicate evaluation of habitat restoration measures aimed at natural production. Historically hatcheries have been treated as mitigative features to replace lost or degraded habitat. If this program, is to restore natural habitat then limited funds should be designated for such purpose and not diverted to artificial fish production.

Consistency with Other Programs. The long-range Program should at a minimum meet and preferably exceed, the environmental protection of existing programs such as Endangered Species Act Biological Opinions and Recovery Plans, the Central Valley Project Improvement Act including the Anadromous Fish Recovery Plan(AFRP), Water Quality Control Plans, the San Joaquin Valley Drainage Implementation Program, etc. For example, some areas of this document are inconsistent with the AFRP. The AFRP goal for winter-run chinook salmon is 110,000, while the goal in this document is 40,000 adults. This may be an oversight reflecting the inconsistency between the National Marine Fisheries Service's winter-run recovery plan and the AFRP, but should be corrected. Determining if other aspects of the AFRP have been included in the objectives is difficult. Although discussions at the workshops held recently clearly indicated that at least the Red Bluff Diversion Dam operations are being considered, this can not be determined readily in the document objectives. The document should be revised to clearly show what is being considered.

The document also should have a clear description of how the Program will interface with other ongoing programs such as those present on non-CVP controlled rivers. In some instances, such as the lower Mokelumne River and lower Tuolumne River, established organizations have determined ecosystem goals and are taking actions to implement them. Perhaps some formal memorandum of understanding or similar documents may need to be crafted to ensure effective ecosystem planning and implementation occurs.

Improving Upon Existing Conditions Past Chipps Island. We were unable to find in Table 8, or elsewhere in the document, that any additional water/flow would be used to move X2 toward San

Pablo Bay. Consideration should be given to providing additional water to meet existing and future biological needs past Chips Island. Every means should be made to improve upon the existing conditions for recovery of the aquatic ecosystem.

Research Needs. Additional research is needed to identify which introduced species compete with or are significant predators of native fish species upstream of the Delta, and in the Delta. This is critical if one of the objectives of the plan is to maintain or restore introduced fish species such as striped bass, largemouth bass, and white catfish. These species could be significant predators on native fish species.

Terminology. While we agree that all components of the Program must be written so that the reader is able to understand what is written, the credibility of the document and ultimately of the Program, must be based upon technical correctness.

As a result of the effort to reword definitions of physical and biological processes so that they are understandable, new meanings for standard engineering or biological/ecological definitions appear to have been generated where the standard definition would be more appropriate. As an example, hydrograph is defined in Table 3 as "Hydrograph refers to the total amount and seasonal distribution of water entering the ecosystem, including groundwater, and includes episodic events such as flood flows and drought cycles ...." Definitions from a standard hydrology texst would be, "A hydrograph is a graph of stage or discharge versus time" or a "Hydrograph is a continuous graph showing the properties of streamflow with respect to time, normally obtained by means of a continuous strip recorder which indicates stage versus time, and is then transformed to a discharge hydrograph by application of a rating curve." (Hydrology for Engineers, Linsley, Kohler, and Paulhus, 1975 and Introduction to Hydrology, Viessman, et al., 1977). Hydrographs are watershed specific and do not give an indication of "water entering the ecosystem". We suggest that all definitions of physical and ecosystem processes and functions be examined and rewritten as appropriate to define these terms using standard engineering or biological/ecological definitions.

Throughout the document, many terms are incomplete or vague in meaning. Terms such as "basin", "basin wide", "adaptive management", etc. should be more completely defined. Where resident fish are discussed in the document, "resident, anadromous and estuarine fish" should be substituted for "resident fish". Other terms need to be specifically defined. For example, restoration to "natural" conditions is mentioned throughout, but in general, no attempt is made to specify what is meant by "natural." Terms which are similarly vague and lend themselves to misinterpretation should be defined. Terms such as "some", "some semblance", a "portion", and "appropriate actions" are frequently used. These are very general terms which if strictly interpreted could mean very small increases for any given resource. These should be made more specific. They are highly subjective and very broad interpretations.

Terms that are subjective with regard to natural resources such as "valuable", "important", or "desirable" should be deleted. This is an ecosystem plan and should reflect the importance of

everything in the ecosystem. In addition, restoration should be defined. Restore implies bringing something back to near original condition which is not the intent of this program.

The terms "problem area" and "solution area" are used in discussion but there are no attendant explanations of how these areas will be treated organizationally, strategically, etc. Further explanations are warranted.

In addition to ensuring clear definition of terms, background discussions should be included to explain how certain terms that have broad action implications are to be implemented. For example, the term "adaptive management" is partly described under the program strategy discussion on page 12 but there are no specific examples that demonstrate how it would be applied.

Specific Comments:

Page 1. The report states that its purpose is "to describe how CALFED is identifying its targets." It then states that the report does not include "the basis or rationale for targets or groups of targets because some tasks are incomplete." Together, these statements indicate that CALFED is identifying its targets without a completed basis or rationale. All future versions of the plan should include the rationale for selection of targets or groups of targets.

Page 2, Ecosystem Restoration Program. In the definition of a healthy ecosystem, "people using the system" is too broad. If this includes people using the system from the outside, for example out-of-basin water users, then the designation of this plan as an ecosystem restoration program is incorrect. It is a multiple-use program that considers some elements of the developed ecosystem, and its name should be changed to reflect this. Recovery objectives should be included in the definition of Ecosystem Restoration Program.

Page 3, There are five basic tasks to developing ERPP. The ERPP should address the following 6th task, which should be completed before proceeding with the other five: Define what the ecosystem is, determine how it functions or doesn't, and identify the significant problems that need to be remedied in order to restore the ecosystem and the species dependent upon it.

Page 4. There is a statement that targets may vary with storage and conveyance alternatives. This is an ecosystem restoration program that is a stand alone program element and targets should be developed for the purpose of restoring the ecosystem and not as mitigation or amelioration of other project affects.

Page 4-5, Approach to Developing Preliminary List of Ecosystem Elements. The way this section is written is very confusing. This is the section that identifies elements which may lead to effects outside the Delta that are related to past Delta actions that have led to the decline of ecosystem functions. These Delta actions are stressors to threatened and endangered species largely through installation of infrastructures in support of water delivery and through habitat

conversion of natural lands. Further degradation of these areas may compromise the desired certainty of other program elements. The plan should include all areas which historically have been affected by water deliveries through the Delta as well as those areas which would receive deliveries as a result of the Program.

As currently stated the objective of the Program is "ecosystem restoration". However, for a species or habitat to be considered "important" to the restoration effort it has to meet the criteria of being a listed species, economically important, or a major prey species. Because we do not know all there is to know about the relationships between plants and animals and the habitats they depend on within the Bay-Delta, simply putting the major pieces of the puzzle together does not necessarily mean that the ecosystem will be whole. The entire ecosystem needs to be restored, regardless of the value of the species/habitat to people/economics or its current listing status.

The resource experts assembled from CALFED staff and staff consultants should identify as well as the limits of available information. For example, we do not always know the processes "that drive the ecosystem and its species and species groups". Soon in the planning process, if not in this report, known data and data gaps should be identified, citing all sources of information available to guide and justify the restoration objectives and targets.

Page 4, Target, last sentence. Although the targets are to be based on realistic expectations, be balanced against other resource needs, and must be reasonable, affordable, cost effective, and practicably achievable, the detail of the targets which are provided is so general that making this determination is very difficult, if not impossible. The ERPP should contain as much detailed information as possible to facilitate the analysis necessary to make these determinations and should be revised to include more detail and demonstrate the rationale behind each target selection.

Page 5. Stated objectives must meet the "two primary criteria stated by CALFED: 1) that objectives be acceptable to all stakeholders . . ." The Program may not be able to succeed as a result of this criteria, because, with so many conflicting interests, getting acceptability by all stakeholders may be impossible. The Program should reevaluate whether this is a realistic objective and/or develop means for resolving conflict and making Program decisions as part of this objective.

Page 6, The Ecosystem Restoration Planning Area. This section should be expanded to explain the rationale for defining the geographic area. Problems are occurring outside of the Delta which are directly related to actions within the Delta. Areas outside the Delta where problems are occuring include the San Francisco Bay, the Sacramento Valley, the Sierra Foothills, the San Joaquin Valley and the Tulare Basin. Additionally, terms such as "watershed improvements" should be defined.

Page 7, Secondary Ecosystem Processes and Functions. The document lists physical processes as primary and biological/ecosystem process as secondary. However, physical processes should not

be separated from ecosystem processes and functions because an ecosystem includes both physical and biological components. Additionally, some of the elements listed as secondary processes include autotrophic production and decomposition cycle components which are not caused by or the result of stated physical processes. The document does not appear to recognize primary biological processes and functions and should be revised.

Page 7 and Table 6, Habitats. Habitats should be defined using a known published habitat classification system.

Page 8, line 4, number 3. The statement concerning "habitat producing species" is too general and has little relevance. Replace this statement with "important in maintaining ecosystem functions or biological diversity."

Page 11, Ecosystem Quality Objectives. Table 1 should be reevaluated and revised accordingly. Associating the objectives with the existing problems is difficult. The following is suggested wording which would assist in clarifying the meaning of the Ecosystem Quality Objectives:

A. **Maintain and Restore the Natural Processes and Functions** which have created and sustained the Bay-Delta ecosystem and its habitats, including the river systems which flow into the Bay-Delta.

1. Maintain and restore the natural hydrologic processes of the watersheds which sustain wetland and riverine habitats in the Bay-Delta and in the rivers which flow into it, and are important to ecosystem integrity and function.
2. Maintain and restore geomorphic processes which sustain the riparian and aquatic habitats of the rivers which flow into the Bay-Delta, and which provide quality riverine edge habitat for native fishes, and riparian habitats for diverse wildlife species.
3. Maintain and restore tidal flow patterns and salinity gradients which sustain freshwater and saltmarsh wetlands.
4. Maintain and restore sediment transport processes and balances to sustain shallow-water habitats in the Bay-Delta, and provide sediment deposition areas for the continued, long-term establishment and growth of riparian vegetation along the rivers flowing into the Bay-Delta.
5. (Continue List)

Page 11, A. Reword to state that the objective is to: Improve and increase aquatic habitats to support sustainable populations of all native resident, estuarine and anadromous fish.

Page 11, A(1)(a). Define "early rearing" and explain why this is the focus for increasing shallow riverine aquatic habitat rather than all rearing periods.

Page 11, A(1)(b). Define the use of the term "main channels".

Page 11, A(2)(c). Replace with "Shaded riverine habitat will provide localized temperature reduction and provide for spawning, rearing, feeding, resting, and cover requirements for aquatic species."

Page 11, A(1 and 3a), Increase habitat to allow for sustainable populations of some resident species. Identify which species will be lost as a result of the CALFED operations and proposed project. Since the plan is to be an ecosystem plan, all native resident species should be targeted.

Page 11, A(3), Increase . . . support the fish production capacity of the Delta. This statement should be clarified. Production capacities for any habitat and species are based on many variables. This section does not make clear the objective fish production capacity. This section should be clarified to state that the objective is to support fish production at the (maximum/minimum/optimal) level and then define what that means.

Page 11, A(3)(b), Reduce water hyacinth . . .. Other exotic plants such as hydrilla, Arundo, egeria, phragmites, etc. that are or have a potential to cause problems should also be addressed. Herbicides will certainly need to be used but with care and proper risk assessment, especially near listed species. Eradication of hydrilla from Clear Lake should be a priority to preclude spread of this exotic nuisance plant into the Sacramento River and the Delta.

Page 12, A(6), Reestablish appropriate upstream and downstream movement of anadromous and estuarine fish species. The term "appropriate" should be defined and should indicate whether this is for fish or some arbitrary number.

Page 12, A(7), Support sustainable populations of desirable fish and other species. Define "desirable fish." Since the overall goal of the Program is to develop a long-term comprehensive plan to restore ecosystem health, all native fish should be considered target species. To successfully restore ecosystem health, we must keep all the parts. The term "desirable" should be replaced with "native."

Page 12, A(7)(a), Reduce entrainment of biological productivity throughout the aquatic foodweb. Explain what is meant and how biological productivity is entrained.

Page 12, A(7)(b), Reduce concentrations of toxicants . . . . This is a very generic statements that needs to be more specific. A distinction should be made between acute and chronic levels and whether pesticides or selenium is being considered. This section should be rewritten to integrate the work of the water quality work group into the ecosystem restoration planning.

Page 12, A(4)(b & c). A more precise definition of low salinity habitat in Suisun Bay and brackish habitat in San Pablo Bay should be given. Additionally, it seems more appropriate to discuss saline habitats in San Pablo Bay instead of brackish.

Page 13, A(7)(e), Increase nutrients from wetlands to aquatic habitat. The intent of this

statement is not clear and should be clarified.

Page 13, A(8). Determining the adverse effects being referenced is difficut because of the non specific nature of this statement. Even though peak winter storm runoff through the Delta carrying concentrations of several pesticides that are toxic to test organisms has been documented, some argue that it does not have a significant impact on the resources in the Delta. Again, reference to the water quality committees' work may be better.

Page 13, B(1)(a). This whole objective needs to be better defined. Explain what improvement of vegetation composition means and what is known about how salinity specifically impacts vegetation composition. If the objective is to modify salinity levels, are they going to be increased, decreased or changed through timing? While we agree with the concept of increasing brackish marsh habitat, the document needs to identify (1)what existing habitats will be impacted and (2) the salinity regimes that will need to be established to meet the objective.

Page 13, B(1)(c). Explain what is meant by "connectivity." Is this the same as more contiguous habitat? Is it more important for some species than others? This statement occurs elsewhere in the document and modifications should be made in each of these section as well.

Page 13, B(2)(a) Restore appropriate salinity levels . . . for some native species. Define "appropriate" salinity levels and the rationale behind selection. This appears to be in conflict with the overall goal. Define the species and reevaluate whether this is desirable, and if so, whether the goal of CALFED can be met or whether revisions in Program goals are necessary.

Page 13, B(2)(c). Define "dependent species". Which species are these? Is gene exchange desirable for all species? Probably not. If not, for which species would it be desirable?

Page 14, B(3)(a), Increase amounts of riparian . . . for some native bird species. See comment for Page 13, B(2)(a) above.

Page 14, B(4)(a)&(b). This section should incorporate other avian groups such as wading birds and shorebirds.

Page 14, B(5)(d), Reduce the vulnerability of some existing wintering wildlife habitats to levee failures. This element should be removed or modified. Levee failures where land elevations are -1.0 ft mean sea level (MSL) to slightly above MSL may in fact be beneficial to wintering wildlife. Levee failures where lands are below -10.0 ft MSL may require years to develop a shallow aquatic or emergent habitat but will ultimately provide habitat for wintering wildlife and a host of other species during all stages of succession.

Page 15, B, 7(b). "Improve" should be defined and some specific examples of a narrow restricted channel included.

Page 15.C. Define "population health" and explain the criteria used to determine it.

Page 15.C(1). This should read: threatened and endangered species, Federally proposed species, or species of special concern.

Page 15.C. Add the following as number 4: Keep species and populations from becoming endangered or threatened.

Page 17. The habitat definitions in Table 2 do not appear to be the same terms as those used in Table 1. Terms in all tables should be reviewed and corrected as necessary to make a consistent document. We suggest using an established classification system such as the Wildlife Habitat Relationship System Classifications consistently throughout the document.

Page 17-18 and 21-24, Tables 2 and 4, Secondary Ecosystem Processes. Add "Habitat" and "Transport flows" to move juvenile fish, eggs, nutrients to and through the Delta. "Current velocities" seems too vague. Appropriate Implementation Targets and Objectives would need to be developed also.

Page 17-18 and 25-26, Tables 2 and 5, Stressors. Some basic stressors are not explicitly listed, notably habitat loss, and altered hydrology, including changes in flow magnitudes, timing, and direction. Clarity of the document is sacrificed when basic stressors are labeled by terms such as "land use" and "water management".

Pages 17 and 25-26, Table 2 and Table 5. The discussion of "Human Disturbance" should clearly identify erosion caused by boat-wakes as an important stressor for the Delta or list boat-wake erosion as a separate stressor. B
oat wakes are a substantial source of bank erosion in the Delta, which directly degrades water-edge habitats, and indirectly impacts those habitats by increasing the need for bank protection.

Pages 17-18 and 27-29, Tables 2 and 6, Habitats. Add riverine habitat. Appropriate Implementation Targets and Objectives should be developed also.

Pages 17-18 and 27-29, Tables 2 and 6, Habitats. Add shallow-water and mudflats (can be a single habitat). These are important to shorebirds, wading birds and numerous fish species and are distinct from emergent wetlands. Appropriate Implementation Targets and Objectives would need to be developed also.

Pages 17-18 and 31-40, Tables 2 and 7, Birds. Add the bank swallow which is a State-listed species to the table. The least Bell's vireo, a federally-listed species, is a species which might be able to return to Central Valley riparian areas if restoration of these habitats were adequate and should be evaluated for inclusion in the Program targets. Appropriate Implementation Targets and Objectives would need to be developed also.

Page 17, D, Habitats. An unshaded riverine aquatic habitat should be added.

Page 18, Amphibians and Reptiles. Add "Non native amphibians and reptiles" as a new category after #21.

Page 18, Plants, 44. Delta button-celery. One plant species appears to be too narrow for this category. Expand this list or clearly state the rationale for including only one species. See general comments.

Pages 19-24. Many of the terms and associated definitions in these two tables need to be reviewed and revised to state accurate, standard definitions. See general comments above concerning terminology. In addition, these tables are primarily definitions and editorial comments such as "There are opportunities to restore..." should be removed.

These tables would be more useful if the "Basis" paragraphs also addressed the existing problems/stressors which could be remedied by restoration for each process and function..

Page 19, Hydrograph. The last sentence describes opportunities to restore "where appropriate" a more natural hydrograph. Some basis is needed for the decisions on when it is appropriate or not, to establish a more natural hydrograph.

Low summer flows should be added as an episodic event.

Page 21, Estuarine Mixing. The discussion of entrapment and null zones and X2 water quality standards is redundant. X2 is a regulatory standard and although very important, is not by itself and ecosystem function.

Page 22, Water temperature, last sentence. Unnaturally low water temperatures should be included along with unnaturally high temperatures as stressors of aquatic organisms.

Page 22, Current velocities, last sentence. It is unnecessary and premature to state that opportunities to restore more natural velocities are open primarily through channel manipulation and secondarily through reservoir releases. More detailed information on channel manipulation techniques and cost is necessary before such an assignment of priorities can be made.

Clarify "changes in flow rates downstream of reservoirs" and indicate if this is to change flow releases from reservoirs.

Page 23, Nutrient inputs. Human activities can cause excessive levels of nutrients as well as deficiencies. What evidence is there for either?

Page 23, Primary and Secondary Production. These sections are unclear and need clarification. Primary and secondary production refer to the production of organic matter, not energy, by autotrophs (photosynthesizers). Secondary production is the production of organic matter by a primary consumer, with a primary consumer being an organism that feeds on plant material.

Page 23, Secondary production, last sentence. "Organic carbon forms" are the basis of any food web, since they are the basis of food. The intention may be to say that the Bay-Delta is a predominantly heterotrophic system, but this is unclear and it may not be true.

Page 25, Levees, bridges, and bank protection. Clarify in this section that these structures also have the potential to increase bank erosion. The placement of rip-rap increases flow velocities and contributes to erosion directly above and below the revetment, requiring the placement of additional protection measures and materials. Bridges can have a significant impact on stream morphology, changes to stream bed elevations, etc. have been documented both above and below structures and can be measured several miles above or below the structure unless some sort of natural control structure exists which regulates the channel's morphology.

This section should also note that bank protection typically reduces the river-edge environment from one that is complex and diverse, biologically and physically, to a relatively simple and uniform environment.

Page 25, Dredging. Dredging should include a discussion of disposal and placement of dredged materials. We note that dredging not only can affect channel banks but may also contribute to stream bed instability as the channel "headcuts" upstream in an effort to stabilize the channel bed's gradient. This can result in increased erosion and channel instability miles above and below the actual dredging site.

Page 26, Water Management. This discussion should be expanded to include the migration affects to all fish including delta smelt, longfin smelt, Sacramento splittail, and other locally migratory fish that cue on flows.

Page 26, Gravel mining. The effects of gravel mining on the stream morphology can be similar to dredging. Not only can it affect channel banks but may also contribute to stream bed instability as the channel "headcuts" upstream in an effort to stabilize the channelbed's gradient. This can result in increased erosion and channel instability miles above and below the actual dredging site. In addition, fish can be stranded if bed gradients do not allow fish to escape.

Page 26, Contaminant. We suggest using the word "acute" rather than "severe" toxicity. This statement should be reevaluated to determine the appropriate specificity.

Page 27-29, Habitat. We recommend that an established vegetation/habitat based classification system be used rather than descriptions presented in this table.

Pages 27-78, Tables 8 through 12. These tables seem to lack continuity. How are habitat actions related to species actions? Tables need to be cross referenced and a discussion included to identify when things are additive in nature versus conjunctive in their benefits across resource areas. For instance how do riparian restoration targets cross over between fish and birds? How does tidal marsh restoration for salt marsh harvest mice relate to other ecosystem components.

There are many occurrences of "some", "some semblance", a "portion", "appropriate actions". These are very general terms which if strictly interpreted could mean very small increases for any given resource. They are highly subjective in nature and open to very broad interpretations. These should be made more specific.

Page 27, Dead-end sloughs. Here, and in several other places in this document, the term carbon input or carbon production is used when the reference is to organic matter. The main source of carbon in any ecosystem is carbon dioxide photosynthesized by plants to make carbohydrates. The references are to carbohydrates, not the carbon, and nomenclature should be changed to make the distinction.

Page 27, Seasonal wetland and aquatic. This table discusses the loss of shorebirds and other water birds but this is not reflected in Table 1. Review all Tables for consistency and modify as necessary.

Page 28, Mid Channel Islands and Shoals. This section should discuss the importance to young-of-the-year fish and rearing. These may also provide spawning substrates for certain species such as delta smelt.

Pages 31-40 and 49-56, Table 7 and Table 10. Table 10 does not appear to include any of the guilds or plant or animal association listed in Table 7. Clarify the rationale for omitting them or modify the document to be consistent.

Page 33, California red-legged frog. This species has been extirpated from the Delta and any actions to restore would have to start outside the Delta. Explain the rationale for including a species, such as the red-legged frog, but not including the San Joaquin kit fox which also has been extirpated from the Delta but is clearly connected to water delivery from the Delta and affects from the construction of canals and reservoirs. As discussed above, those species which are affected by water delivery from the Delta, such as the San Joaquin kit fox, should be included.

Page 33, Amphibians and Reptiles. Add "Non native amphibians" as a new species group.

Page 34, California clapper rail. This species has declined more from reclamation of tidal salt marsh to urban rather than agriculture. This section should be revised accordingly.

Page 35, Mammals. We recommend the addition of the river otter to this list because it is a good indicator species of habitat condition.

Page 35, Salt Marsh Harvest Mouse. This species has also declined more from reclamation of tidal salt marsh to urban rather than agriculture. Additionally, substantial loss of non-tidal and upland refugial areas have largely contributed to this species decline.

Page 35, Riparian brush rabbit. The riparian brush rabbit is a Federal candidate species.

Page 35, Wildlife habitat guilds. Replace phalaropes in the deep water guild with a fish like sturgeon. The phalarope species typically found in the Delta use shallow-water habitats.

Page 36, Saline emergent wetland wildlife guild. Replace deer mouse with salt marsh harvest mouse.

Pages 38 and 76, Table 7 and Table 12. The representative list of neotropical migratory birds should include "warbling vireo" (typo in Table 12, absent from Table 7), and should not include the cliff swallow, which is not associated with riparian habitats. The cliff swallow is doing extremely well as bridges and buildings provide many nesting opportunities.

Page 39, Plant Species Associations. The species that are discussed are proposed for Federal listing and the text should reflect that. The language in the text implies that decisions pertaining to their status have been made which is incorrect.

IN CONTRAST TO Previous Statement

Page 41, Table 8. No where in Table 8 or in other sections of the document, is additional water/flow suggested as a target to move X2 toward San Pablo Bay. We recommend that a target be developed to provide additional flows to improve upon existing and future biological and ecological needs beyond Chipps Island.

Page 41, Hydrograph. Emulating the pattern of the natural hydrograph can have pitfalls, particularly for the main stem Sacramento because the system has been changed so much by the presence of Shasta and Keswick Dams. For example, the location of winter-run spawning has been altered, sediment supply and spawning gravel recruitment has been cut off, and fall and late-fall fry are not able to move upstream past Keswick to rear in different conditions. Functional relationships such as physical habitat versus flow, water temperature versus flow and Tehama Colusa Diversion operations, food supply versus flow, redd dewatering, juvenile stranding, etc. need to be considered as much as the pattern of the natural hydrograph.

Page 41, Hydrograph, A(2). Flows should also be provided to promote the maintenance of riparian corridors as well.

Page 41, Hydrograph, A(3). This target should be dropped. If the stream/tributary already has a natural hydrograph and the objective is to restore the natural hydrograph why would you want to manage storage to "improve" the tributary? This target seems to be more of a recommendation to develop more water storage/dams than a target to restore the ecosystem.

Page 41, Hydrograph, B(1). Since the summer base flows on the Sacramento River were historically much less than existing flows, restoring base flows where existing flows are less than historical, would result in additional water in the system. Historical flows should be considered as a guide to determine flows and timing for environmental needs, not to provide additional export during critical periods.

Page 41, Natural hydraulic regime. The management of physical barriers to more closely emulate hydrology should be removed. There are very few barriers in the Delta now and those that are proposed have significant adverse effects on Delta resources.

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Page 41, Natural sediment supply. This section should be more fully defined. We recommend that a target be developed to remove all in-stream gravel operations within the San Joaquin/Sacramento River system to reduce adverse impacts of fish as a result of stranding, redd covering with sediments, changes in gravel recruitment and degraded water quality.

Page 42, Geomorphology, C(2). The section on armoring in channel islands should be deleted as a target. This may violate one of the solution principals which is transference of impacts to other resources. The use of armor reduces the amount of high quality shallow water habitat and mud flats and in certain areas inhibits the formation of new riparian habitat. More appropriately, a target should focus on the problem which is identified as boat wakes. There are many forms a solution could take such as exclusion zones, speed regulations, or wave attenuation which involves very little in-water work. Armoring also is inconsistent with the goal of restoring the ecosystem through natural processes.

Page 43, Tides, A(1). This statement needs explaining. Dikes/levees currently limit much of the tidal volume within the Delta. Is the proposal/target to remove dikes and restore tidal action to currently diked baylands or to somehow increase the tidal volume without the removal of dikes/levees (i.e., major dredging projects)? We recommend that this section be removed. This target is largely out of the control of the Calfed Bay-Delta Program.

Page 43, Tides, B(1). Define net downstream flow in terms of extent. Does this mean all the way through to Suisun Bay or as measured locally in Old River?

Page 46, Water temperature, A(2). Establishing desirable summer water temperatures below major storage reservoirs for salmon and steelhead rearing constitutes the reversal of a natural ecosystem process. It should perhaps be separated from other targets here, and assigned to objective C1 only.

Page 46, Nutrient inputs and availability. This is a concept that will be virtually impossible to control or to place cause and effect. Is the Delta nutrient level limited? Was this section intended relate to the concepts from Table 8? The document should be revised to connect concepts in the other tables and made consistent through the document.

Page 47, Aquatic secondary production, A(1). Increasing nutrient levels could have unpredictable detrimental consequences. The target of increasing residence time seems potentially inconsistent with targets for manipulating water velocities. This target would most likely be a biproduct of other actions and quantitatively in not within the control of this program.

Page 49-56, Table 10. Without additional refinement and specificity, the discussion concerning targets is not very meaningful. For example, if you are going to "reduce entrainment of fish and nutrients into diversions by 50% in the Bay, Delta, rivers, and tributaries.", what is the base for the 50%? Is it 1960 or 1996, and why? If one is going to "Reduce stranding of fish in seasonal or managed wetlands, flood bypasses, or leveed lands", do we know what the stranding level is

now? Is it a problem? To what level will it be reduced? All targets should be reviewed and the rationale associated with each should be provided.

Page 49, Levees, bridges, and bank protection, B. We recommend that vegetation and maintenance practices be modified along all levees, not just a certain mileage. Vegetation management practices are probably one of the sole managements action that could contribute the most to levee habitat restoration with very little capital cost. This section should also include the Delta, not just the rivers and tributaries.

Page 49, Dredging, A. This section should include a section which addresses the placement of dredged materials. The current practice of placing dredged materials has effects on seasonal wetlands and along levee slopes. These actions preclude natural processes from taking over.

Page 49, Dredging, A(1). This target should also include the reduction of dredging to modify/increase flow conveyance.

Page 49, Land Use. We do not concurr with a buffer width of 100 feet for the giant garter snake and western pond turtle. A more appropriate width would be _____. Additionally, "Manage land uses adjacent to . . ." may not be possible. Controlling the use of pesticides, etc on adjacent private lands to establish buffer zones would only work in a cooperative agreement with land owners.

Page 50, Land use, D. This discusses "reducing the loss" of habitats for amphibians and reptiles associated with maintenance activities. Most of the activities that are discussed are already regulated under Federal law, specifically the Clean Water Act. However, to date this has been ineffective. Reducing the loss will only prolong the decline rather than reverse it. To facilitate the recovery of these species the Program should maximize the protection of existing habitats, enhance known former habitat areas within the range of the species, and then create new habitats.

Page 50, Wildfire. Targets for controlling wildfires through forest and rangeland practices seem somewhat out of place in a Delta plan. To single out fire and ignore stressors such as grazing, agricultural paractices, urban development, road-building and land-use patterns suggest a reductionist rather than an ecosystem approach. Stressors within the upper watersheds should be expanded in the document.

Page 51, Exotic species. We suggest that the section addressing exotics be expanded and made more specific. Of the large number of exotic plant species of concern, only water hyacinth is mentioned. The plan should be strengthened by including other exotic plant and animal speciecs of concern. For instance, striped bass is a nonnative fish species which directly competes with various native fish species found within the Delta and Arundo is a nonnative plant which is a stressor in the Delta. These species as well, as others, should be identified as exotic species and as stressors in this table.

We are also concerned that the suggested reductions may not be appropriate, defensible, site-specific, and species-specific. How were reductions of 50% and 10% chosen? In what specific

cases are these appropriate choices? Ten percent may be enough for some species, but not others in some situations. Without knowing how many individuals there are in the Delta, there is no way to determine if the objective has been met. An initial, intensive eradication effort is needed to significantly reduce exotic species such as Arundo which is quickly taking over some levees in the Delta.

Page 51, Exotic species, A(2). The exotic plant management at Antioch dunes may already be taking place. The target should be defined in a manner to help implement and surpass the current refuge management plan.

Page 51, Exotic species, A(4). Invasive exotic plant species along the rivers and tributaries are due largely to levee management practices. Exotic species are pervasive in disturbed environments. A change in vegetation practices with a planting program may be more effective than a plant eradication program. Other methods of controlling exotic plant species should be reevaluated and integrated into the plan.

Page 51, Exotic species, B(1 and 2). Bullfrog and other predatory animal management for the California red-legged frogs will be ineffective at this scale. This is an area where the focus of the plan should be on habitat protection, restoration, and reintroduction. The key is not to introduce frogs into predator rich areas. Predation management should then be a key component of habitat actions, but not as a stand alone target.

Page 52, Exotic species, B(3). Predator control for the red fox and the Norway rat should be restated in terms of areas that need to be trapped or managed. A percentage of 10% will be difficult at best to determine when such an action is complete. Additionally, if the action is a 10% increase in a predator poor area the benefit will be lost. An example target might be restated that complete predator management programs will be implemented in areas that have nesting activity for the California clapper rail, black rail etc.

Page 52, Exotic species, C(1). The target should be to eliminate the influx of exotic species not just reduce them.

Page 52, Water management and diversions, A(1 and 2). The objective and target of reducing the entrainment of nutrients into diversions are confusing, since there will usually be higher levels of nutrients in return flows than in diverted water. There does not appear to be any way to screen nutrients, short of tertiary treatment at diversion sites. The entrainment of fish and entrainment of nutrients are separate problems, and the significance of fish entrainment is well documented, while nutrient dynamics and entrainment in the Delta are less understood. This should probably be rewritten in terms of fish alone. Nutrients are not within the control of diversions to prevent.

Pages 52 and 53, Water management and diversions, A(2 and 3). Again, striped bass are emphasised without recognizing other fish species. This section needs to be expanded to all fish

not just striped bass.

Page 53, Water management and diversions, D(2). Providing appropriate outflows at important times of the year supposes that certain times of the year and certain ecosystem processes are unimportant. Determination of which parts of the ecosystem are unimportant should be made with care .

Page 54, Contaminants. The reduction of contaminants should be focused on source reduction rather than dilution by flow. Again the program should focus on the solution of the problems, not just a solution. Land retirement should be considered as a target for implementing the reduction of non source contaminants as well as a means for recovery of species severely impacted by the delivery of water from the Delta. The implementation objective should be to reduce the total of contaminants/pollutants within the ecosystem.

These targets should be more specific and we suggest the following language be added, based on the Water Quality committee's work: 1) Reduce heavy metal loadings to the rivers and delta by implementation of mine drainage remediation. 2) Reduce concentrations of pesticides and other pollutants by expansion and extension of agricultural source control, land fallowing, integrated pest management incentives, and education programs. 3) Reduce urban pollutant loadings through source control incentives and better development planning. 4) Improve source control through watershed management initiatives and cooperative programs within and outside of the delta. 5) Reduce concentrations of pollutants from agricultural sources by altering the timing of discharges. 6) Reduce the discharges of domestic wastes from boats within the delta. 7) Identify water and sediment toxicity via appropriate methods.

Page 54, Human Disturbance. Protecting nesting areas for great blue herons, great egrets and other bird species which nest in trees next to high human use areas should be added.

Page 55, Harvest of fish and wildlife. Although reducing illegal harvest is considered to be beneficial, it will be very difficult to equate this to maintenance or increases in population. The target here should be stated in terms of how illegal harvest would be reduced. What can be done under future conditions that is not being done now to implement existing law? Are we talking about increasing the California Department of Fish and Game budget by 90% to enforce existing Fish and Game codes? More thought should be given to the problem and then focus the target to the problem and not try necessarily to assess benefits in the target statement.

Page 55, Predation and competition. Artificially reducing predation does not appear consistent with the goal of establishing a natural ecosystem.

Page 56, Artificial production of fish. We continue to recommend against the use of hatcheries to improve the production of fish. If the Program is aimed toward ecosystem restoration, it will need to be done without the supplemental production from hatcheries. Hatchery produced fish often compete with natural fish for spatial habitat and may complicate evaluation of habitat

restoratio measures aimed at natural production. Historically, hatcheries have been treated as mitigative features to replace lost or degraded habitat. If this program is to restore natural habitat then limited funds should be earmarked for such purpose and not diverted to artificial fish production.

Pages 57 - 66, Table 11. Since the report has excluded any basis or rationale for targets, it is impossible to evaluate the numerical targets presented here. It appears too early in the process to identify specific acreages of habitat which will be restored. Perhaps the numbers should be left for a later planning stage when a basis and rationale for action can be introduced. There is a general lack of context in terms of what these acreages represent to the whole. Additionally, without knowing what assumptions went into the development of a given target, it is difficult to know where a target is lacking.

Emphasis should be placed on researching the historical habitat patterns within the Delta and comparing them with the current habitat patterns. Targets and habitat needs then can be established which will meet the needs of the target species. When defining habitats, targets should be geographically refined rather than given broad brushed large values. Some specifics concerning the methods that will be used to develop habitat will provide more information with which to determine each target's sufficiency or appropriateness. For example, will tidal habitat be restored by flooding islands or by manipulating existing upland elevations to bring historically terrestrial habitat to tidal elevations?

We are concerned that, given the magnitude of what is proposed, substantial redirected effects may occur to other natural fish and wildlife resource values. Cross referencing tables would help identify potential effects of the proposed action. In addition, this is a table that has qualitative modifiers such as low to moderate habitat quality. The standard by which this is judged should be clearly stated.

Page 57, Nontidal perennial aquatic. Deep open water habitats within the Delta do not appear to be a limiting factor. Deep water habitat is one wetland habitat type which has increased in acreage over the past 30 years both within a regional and national context. This target should be redefined, dropped or given very low priority in terms of dollars and resourses.

Page 59, Aquatic seasonal, C(1&2), Increase the area of vernal pool habitat. This target needs additional explaination. Would the proposed action restore 100 acres of vernal pool wetland or would it restore 100 acres of vernal pool habitat (wetland plus adjacent uplands). The same type of questions apply to the 500 acres of Delta ground beetle habitat. (We note that 100 acres of vernal pool habitat could convert to 1000+/- acres of wetland/upland complex.) Sites suitable for such restoration may be limited and should be identified. Additionally, enhancement of vernal pools is difficult at best. Complete restoration and removal of threats is the key to this habitat type and should be considered for targets.

Page 59, Shaded riverine aquatic. The goal of the Program should be to restore all levee slopes

to a vegetated state rather than some specific mileage.

Targets for the Delta should also include restoration of vegetated, natural banks, in addition to vegetating riprapped banks. A delta ecosystem dominated by revetted banks would lack a fundamental habitat characteristic of the delta ecosystems.

Page 67-78, Table 12. This table is often redundant throughout a given objective. The targets are stated out of recovery plans, if they exist, or management plans. The crux of the issue is how a target will be implemented. Cross referencing tables would assist in determining if actions are appropriate. Then, if additional actions are identified that should be implemented, they should be included as targets in this table.

Page 67, Table 12. For runs/species that are going to be restored, rather than just maintained, the target "Maintain a long-term average cohort replacement rate of greater than or equal to 1.0" may be inadequate, since a rate of 1.0 would just maintain, not increase the population. For desirable species, i.e., native fishes, the average cohort replacement rate should be greater than 1.0. For introduced species (stressors) the cohort replacement rate should be less than 1.0.

Page 69, Sacramento splittail, B. Reducing harvest of splittail will have very little, if any, effect on the population. The target for this species should be flow and habitat related. The rate and magnitude of ramping rates should be reduced on rivers such as the American River to maintain spawning habitat through the spawning season. Restoration of shallow water spawning areas with sufficient flow to support the habitat is another key consideration for this species.

Page 72, Fish Species Groups, B. The target of reducing diversity of nonnative fish should be reworded. Species diversity coutld be reduced at the same time that the number of individuals in a single species increased. The result could be an exacerbation of the problem rather than a reduction of a problem.

Page 72, California red-legged frog. Since the frog has been extirpated in the Delta this objective and related targets should be reevaluated and better defined. Has the program identified five core habitat areas? Increasing the population by some percentage will be difficult because the current population numbers are not known. Preserving large population centers regardless of size would be a more appropriate goal. Reintroduction into the historical range on the Central Valley floor may be another target to consider.

Page 72, Giant garter snake. Very preliminary data indicates that the giant garter snake may have a differential sex ratio favoring females. This target may need some further analysis. Restoration of five core areas is a good start. However, the five counties in the Delta region that currently have occupied habitat have the largest areas secured. Additionally, securing habitat may only be part of the solution. Implementing best management practices on irrigation canals, and water diversion areas such as vegetation clearing may go a long way to habitat restoration. Discussing targets in terms of increasing a percentage of the population is not appropriate at this time because we do not know the current population numbers.

Page 73, California clapper rail. The 1984 recovery plan identifies areas for acquisition and restoration which were determined to be essential for the survival and recovery of the species. There are maps which identify these areas in the North Bay and Suisun Marsh. The targets should reflect that all of these areas be acquired or restored rather than a percentage increase in the population.

Page 75, Salt marsh harvest mouse. The 1984 recovery plan identifies areas for acquisition and restoration which were determined to be essential for the survival and recovery of the species. There are maps which identify these areas in the North Bay and Suisun Marsh. The targets should reflect that all of these areas be acquired or restored rather than a percentage increase in the population.

Pages 77 and 78 (Table 12, page 11 and 12). With respect to specific recommendations regarding plant species, we suggest thinking first in terms of protecting habitat and reducing threats in areas where extant populations occur. Following that, consideration could be given to restoring or enhancing specific locations where target plant species were known to exist (historic sites) and to historic range overall.

In addition, we are concerned about the feasibility of restoration efforts for special status plant species. Data on specific habitat requirements and factors limiting current distribution of plant species are lacking for all species except a very few. Years of research have been dedicated to successful reintroduction and restoration of single plant species (e.g., *Acanthomintha duttonii* or *Amsinckia grandiflora*). If after careful analysis, restoration, enhancement, or translocation are considered to be appropriate, research is needed to clarify how appropriate habitat can be identified and what the potential for restoration, enhancement, or translocation might be. We cannot assume that restoration or enhancement efforts will be successful.

PLANTS IN THE CALFED ECOSYSTEM RESTORATION PROGRAM SOLUTION SCOPE AREA
(BUT, CCA, COL, FRE, GLE, MAD, MER, NAP, SAC, SJQ, SHA, SOL, SON, STA, SUT, TEH, YOL)

Scientific name	County(ies)	Status
Listed species		
Amsinckia grandiflora large-flowered fiddleneck	**CCA*, SJQ**	E
Blennosperma bakeri Baker's stickyseed	SON	E
Camissonia benitensis San Benito evening primrose	FRE	T
Castilleja affinis ssp. *neglecta* Tiburon paintbrush	NAP	E
Caulanthus californicus California jewelflower	FRE	E
Chorizanthe valida Sonoma spineflower	SON	E
Cordylanthus maritimus ssp. *maritimus* salt marsh bird's-beak	**SOL**	E
Cordylanthus palmatus palmate-bracted bird's-beak	COL, FRE, MAD, **SJQ, YOL**	E
Cordylanthus tenuis ssp. *capillaris* Pennell's bird's-beak	SON	E
Eriastrum hooveri Hoover's woolly-star	FRE	T
Erysimum capitatum ssp. *angustatum* Contra Costa wallflower	**CCA**	E
Lasthenia burkei Burke's goldfields	SON	E

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Lembertia congdonii San Joaquin woolly-threads	FRE	E
Limnanthes floccosa ssp. *californica* Butte County meadowfoam	BUT	E
Limnanthes vinculans Sebastopol meadowfoam	NAP, SON	E
Lupinus tidestromii var. *layneae* Pt. Reyes clover lupine	SON	E
Lupinus tidestromii var. *tidestromii* Tidestrom's clover lupine	SON	E
Oenothera deltoides ssp. *howellii* Antioch Dunes evening-primrose	**CCA, SAC**	E
Suaeda californica California sea blite	**SOL**	E
Tuctoria mucronata Solano grass	**SOL, YOL**	E
Proposed Species		
Alopecurus aequalis var. *sonomensis* Sonoma alopecurus	SON	PE
Arctostaphylos pallida pallid manzanita	**CCA**	PE
Astragalus clarianus Clara Hunt's milk-vetch	NAP, SON	PE
Calyptridium pulchellum Mariposa pussy-paws	FRE, MAD	PE
Carex albida white sedge	SON	PE
Carpenteria californica carpenteria	FRE	PT
Castilleja campestris ssp. *succulenta* fleshy owl's-clover	FRE, MAD, MER, **STA**	PT

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Chamaesyce hooveri Hoover's spurge	BUT, GLE, **STA**, TEH	PT
Cirsium hydrophilum var. *hydrophilum* Suisun thistle	**SOL**	PE
Clarkia imbricata Vine Hill clarkia	SON	PE
Cordylanthus mollis ssp. *mollis* soft bird's-beak	**CCA**, NAP, **SOL**, SON	PE
Lasthenia conjugens Contra Costa goldfields	**CCA**, NAP, **SOL**	PE
Lilium pardalinum ssp. *pitkinense* Pitkin Marsh lily	SON	PE
Navarretia leucocephala ssp. *pauciflora* few-flowered navarretia	NAP	PE
Navarretia leucocephala ssp. *plieantha* many-flowered navarretia	SON	PE
Neostapfia colusana Colusa grass	COL, MER, **SOL**, **STA**, **YOL**	PT
Orcuttia inaequalis San Joaquin Valley Orcutt grass	FRE, MAD, MER, **STA**	PE
Orcuttia pilosa hairy Orcutt grass	BUT, GLE, MAD, MER, **STA**, TEH	PE
Orcuttia tenuis slender Orcutt grass	**SAC**, SHA, TEH	PT
Orcuttia viscida Sacramento Orcutt grass	**SAC**	PE
Plagiobothrys strictus Calistoga allocarya	NAP	PE
Poa napensis Napa bluegrass	NAP	PE
Potentilla hickmanii Hickman's cinquefoil	SON	PE
Pseudobahia bahiifolia Hartweg's golden sunburst	FRE, MAD, **STA**, SUT	PE

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Pseudobahia peirsonii San Joaquin adobe sunburst	FRE	PE
Sidalcea oregana ssp. *valida* Kenwood Marsh checkermallow	SON	PE
Trifolium amoenum showy Indian clover	NAP, **SOL**, SON	PE
Tuctoria greenei Greene's tuctoria	BUT, FRE, MAD, MER, **SJQ**, SHA, **STA**, TEH	PE
Candidate Species		
Delphinium bakeri Baker's larkspur	SON	C
Delphinium luteum yellow larkspur	SON	C
Holocarpha macradenia Santa Cruz tarweed	**CCA**	C
Sidalcea keckii Keck's sidalcea	FRE	C
Silene campanulata ssp. *campanulata* Red Mountain campion	COL	C
Species of Concern		
Abronia umbellata ssp. *breviflora* northcoast sand-verbena	SON	SC
Acanthomintha obovata ssp. *obovata* obovate-leaved thornmint	FRE	SC
Agrostis blasdalei var. *blasdalei* Blasdale's bentgrass	SON	SC
Agrostis microphylla var. *hendersonii* Henderson's bentgrass	BUT, MER, SHA	SC
Allium jepsonii Jepson's onion	BUT	SC

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Amsinckia vernicosa var. *furcata* forked fiddleneck	FRE	SC
Arabis bodiensis Bodie Hills rock-cress	FRE	SC
Arctostaphylos bakeri ssp. *bakeri* Baker's manzanita	SON	SC
Arctostaphylos densiflora Vine Hill manzanita	SON	SC
Arctostaphylos klamathensis Klamath manzanita	SHA	SC
Aster lentus Suisun Marsh aster	**CCA**, NAP, **SAC**, **SJQ**, **SOL**	SC
Astragalus monoensis var. *ravenii* Raven's milkvetch	FRE	SC
Astragalus pulsiferae var. *suksdorfii* Suksdorf's milk-vetch	SHA	SC
Astragalus tener var. *ferrisiae* Ferris's milk-vetch	BUT, COL, **SOL**, SUT, **YOL**	SC
Astragalus tener var. *tener* alkali milk-vetch	**CCA**, MER, NAP, **SJQ**, **SOL**, SON, **STA**, **YOL**	SC
Atriplex cordulata heartscale	BUT, **CCA**, FRE, GLE, MAD, MER, **SJQ**, **SOL**, **STA**	SC
Atriplex depressa brittlescale	**CCA**, COL, FRE, GLE, MAD, MER, **SOL**, **STA**, **YOL**	SC
Atriplex joaquiniana valley spearscale	**CCA**, COL, GLE, MER, NAP, **SAC**, **SJQ**, **SOL**, **YOL**	SC
Atriplex minuscula lesser saltscale	FRE, MAD, MER	SC
Atriplex persistens vernal pool saltbush	GLE, MER, **SOL?**, **STA**	SC

Atriplex vallicola Lost Hills saltbush	FRE, MER	SC
Botrichium ascendens upswept moonwort	BUT, TEH	SC
Botrichium crenulatum scalloped moonwort	BUT, TEH	SC
Brodiaea coronaria ssp. *rosea* Indian Valley brodiaea	COL, GLE, TEH	SC
Calamagrostis crassiglumis Thurber's reedgrass	SON	SC
Calochortus longebarbatus var. *longibarbatus* long-haired star-tulip	SHA	SC
Calochortus raichei The Cedars globe-lily	SON	SC
Calycadenia hooveri Hoover's rosinweed	MAD, MER, STA	SC
Calystegia atriplicifolia ssp. *buttensis* Butte County morning-glory	BUT	SC
Calystegia collina ssp. *oxyphylla* Mt. Saint Helena morning-glory	NAP, SON	SC
Calystegia collina ssp. *venusta* South Coast Range morning-glory	FRE	SC
Camissonia sierrae ssp. *alticola* Mono Hot Springs evening-primrose	FRE	SC
Campanula californica swamp harebell	SON	SC
Campanula sharsmithiae Mt. Hamilton harebell	STA	SC
Campanula wilkinsiana Wilkins' harebell	SHA, TEH	SC
Ceanothus confusus Rincon Ridge ceanothus	NAP, SON	SC
Ceanothus divergens Calistoga ceanothus	NAP, SON	SC

Ceanothus foliosus var. *vineatus* Vine Hill ceanothus	SON	SC
Ceanothus sonomensis Sonoma ceanothus	NAP, SON	SC
Chorizanthe biloba var. *immemora* San Benito spineflower	FRE	SC
Chorizanthe cuspidata var. *cuspidata* San Francisco Bay spineflower	SON	SC
Cirsium crassicaule slough thistle	**SJQ**	SC
Cirsium fontinale var. *campylon* Mt. Hamilton thistle	**STA**	SC
Clarkia borealis ssp. *arida* arid northern clarkia	SHA	SC
Clarkia mosquinii ssp. *mosquinii* Mosquin's clarkia	BUT	SC
Clarkia mosquinii ssp. *xerophila* Enterprise clarkia	BUT	SC
Clarkia rostrata beaked clarkia	MER, **STA**	SC
Collomia rawsoniana Rawson's flaming-trumpet	MAD	SC
Cordylanthus maritimus ssp. *palustris* northcoast bird's-beak	SON	SC
Cordylanthus mollis ssp. *hispidus* hispid bird's-beak	MER, **SOL**	SC
Cordylanthus nidularius Mt. Diablo bird's-beak	**CCA**	SC
Cordylanthus tenuis ssp. *barbatus* Fresno County bird's-beak	FRE	SC
Coreopsis hamiltonii Mt. Hamilton coreopsis	**STA**	SC
Cryptantha crinita silky cryptantha	SHA, TEH	SC

Cupressus goveniana ssp. *pigmaea* Mendocino cypress	SON	SC
Cypripedium fasciculatum clustered lady's-slipper	BUT, SHA, TEH	SC
Delphinium californicum ssp. *interius* interior California larkspur	**CCA, SJQ**	SC
Delphinium hansenii ssp. *ewanianum* Ewan's larkspur	MAD	SC
Delphinium recurvatum recurved larkspur	**CCA**, COL, FRE, MER, **SOL**	SC
Epilobium oreganum Oregon fireweed	SHA, TEH	SC
Eriastrum brandegeae Brandegee's woolly-star	COL, GLE, TEH	SC
Erigeron supplex supple daisy	SON	SC
Eriogonum nervulosum Snow Mountain buckwheat	COL, GLE, NAP, SON, **YOL**	SC
Eriogonum nudum var. *murinum* mouse buckwheat	FRE	SC
Eriophyllum nubigenum Yosemite woolly-sunflower	MAD	SC
Eryngium racemosum delta coyote thistle	MER, **SJQ, STA**	SC
Eryngium pinnatisectum Tuolumne coyote thistle	**SAC**	SC
Eryngium spinosepalum spiny-sepaled coyote thistle	FRE, MAD, **STA**	SC
Erysimum franciscanum San Francisco wallflower	SON	SC
Eschscholzia rhombipetala diamond-petaled poppy	**CCA**, COL, **STA**	SC
Fritillaria eastwoodiae Butte fritillary	BUT, SHA, TEH	SC

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Fritillaria falcata talus fritillary	**STA**	SC
Fritillaria liliacea fragrant fritillary	**CCA, SOL**, SON	SC
Fritillaria pluriflora adobe fritillary	BUT, COL, GLE, NAP, **SOL**, TEH, **YOL**	SC
Helianthella castanea Diablo rock-rose	**CCA**	SC
Hemizonia multicaulis ssp. *multicaulis* seaside tarweed	SON	SC
Hemizonia multicaulis ssp. *vernalis* Tiburon tarweed	NAP, SON	SC
Hemizonia parryi ssp. *congdonii* pappose spikeweed	**CCA, SOL**	SC
Hesperolinon bicarpellatum two-carpeled dwarf-flax	NAP, SON	SC
Hesperolinon breweri Brewer's dwarf-flax	**CCA**, NAP, **SOL**	SC
Hesperolinon drymarioides drymaria dwarf-flax	COL, GLE, NAP, **YOL**	SC
Hesperolinon tehamense Tehama dwarf-flax	GLE, TEH	SC
Hollisteria lanata hollisteria	FRE, MER	SC
Horkelia bolanderi Bolander's horkelia	COL	SC
Isocoma arguta Brewer's dwarf flax	**CCA, SOL**	SC
Juglans californica var. *hindsii* Northern California black walnut	**CCA**, NAP, **SAC, SOL, YOL**	SC
Juncus leiospermus var. *ahartii* Ahart's rush	BUT, **SAC**	SC
Lathyrus jepsonii var. *jepsonii* delta tule pea	**CCA**, FRE, NAP, **SAC, SJQ, SOL**	SC

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Layia discoidea rayless layia	FRE	SC
Layia heterotricha pale yellow layia	FRE	SC
Legenere limosa legenere	NAP, **SAC**, **SOL**, SON, **STA**, TEH	SC
Lepidium jardii var. *album* Panoche peppergrass	FRE	SC
Lessingia arachnoidea Crystal Springs lessingia	SON	SC
Lewisia cotelydon var. *howellii* Howell's lewisia	SHA	SC
Lewisia longipetala long-petaled lewisia	FRE	SC
Lilaeopsis masonii Madon's lilaeopsis	**CCA**, NAP, **SAC**, **SJQ**, **SOL**	SC
Lilium maritimum coast lily	SON	SC
Limnanthes floccosa ssp. *bellingeriana* Bellinger's meadowfoam	SHA	SC
Linanthus harknessii ssp. *condensatus* Plaskett Meadows linanthus	GLE	SC
Linanthus nuttallii ssp. *howellii* Mt. Tedoc linanthus	TEH	SC
Lotus rubriflorus red-flowered lotus	COL, **STA**, TEH	SC
Lupinus antonius Anthony Peak lupine	TEH	SC
Lupinus citrinus var. *citrinus* orange lupine	FRE, MAD	SC
Lupinus milo-bakeri Mile Baker's lupine	COL	SC
Madia hallii Hall's madia	COL, NAP, **YOL**	SC

Madia stebbinsii Stebbins' madia	SHA, TEH	SC
Minuartia decumbens The Lassics sandwort	SHA, TEH	SC
Monardella douglasii ssp. *venosa* veiny monardella	BUT, SUT	SC
Monardella leucocephala Merced monardella	MER, **STA**	SC
Myosurus minimus ssp. *apus* little mousetail	BUT, **CCA**, COL, **SOL, STA**	SC
Paronychia ahartii Ahart's whitlow-wort	BUT, SHA, TEH	SC
Penstemon filiformis thread-leaved penstemon	SHA	SC
Penstemon personatus closed-lip beardtongue	BUT	SC
Perideridia gairdneri ssp. *gairdneri* Gairdner's yampah	NAP, **SOL**, SON	SC
Phacelia ciliata var. *opaca* Merced phacelia	MER	SC
Phacelia dalesiana Trinity (Scott Mountain) phacelia	SHA	SC
Phacelia phacelioides Mt. Diablo phacelia	**CCA, STA**	SC
Plagiobothrys mollis var. *vestitus* Petaluma popcornflower	SON	SC
Pleuropogon hooverianus northcoast semaphore grass	SON	SC
Pogogyne floribunda Devil's Garden pogogyne	SHA	SC
Polygonum marinense Marin knotweed	NAP, SON	SC
Puccinella howellii Howell's alkali grass	SHA	SC

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Rhynchospora californica California beaked-rush	BUT, SON	SC
Sagittaria sanfordii Sanford's arrowhead	BUT, FRE, MER, **SAC, SJQ**, SHA, TEH	SC
Sanicula saxatilis rock sanicle	**CCA**	SC
Sanicula tracyi Tracy's sanicle	BUT, TEH	SC
Sedum paradisum Canyon Creek stonecrop	SHA	SC
Sidalcea hickmanii ssp. *viridis* Marin checkermallow	NAP, SON	SC
Sidalcea oregana ssp. *hydrophila* water-loving checkermallow	GLE, NAP	SC
Sidalcea robusta Butte County sidalcea	BUT	SC
Silene occidentalis ssp. *longistipitata* Butte County catchfly	BUT, SHA, TEH	SC
Smelowskia ovalis ssp. *congesta* Mt. Lassen smelowskia	SHA	SC
Streptanthus albidus ssp. *peramoenus* most beautiful jewelflower	**CCA**	SC
Streptanthus brachiatus ssp. *brachiatus* Contact Mine jewelflower	NAP, SON	SC
Streptanthus brachiatus ssp. *hoffmanii* Freed's jewelflower	SON	SC
Streptanthus glandulosus ssp. *hoffmanii* secund jewelflower	SON	SC
Streptanthus hispidus Mt. Diablo jewelflower	**CCA**	SC
Streptanthus insignis ssp. *lyonii* Arburua Ranch jewelflower	MER	SC
Streptanthus morrisonii ssp. *elatus* Three Peaks jewelflower	NAP, SON	SC

Streptanthus morrisonii ssp. *hirtiflorus* Dorr's Cabin jewelflower	SON	SC
Streptanthus morrisonii ssp. *kruckebergii* Kruckeberg's jewelflower	NAP, SON	SC
Streptanthus morrisonii ssp. *morrisonii* Morrison's jewelflower	SON	SC
Streptanthus sp. nov./ined. Pit River jewelflower	SHA	SC
Trifolium bolanderi parasol clover	FRE, MAD	SC
Tropidocarpum capparideum caper-fruited tropidocarpum	**CCA**, GLE, **SJQ**	SC

* Counties in bold are within the Problem Scope Area (CCA, SAC, SJQ, SOL, STA, YOL).

PLANTS IN THE CALFED ECOSYSTEM RESTORATION PROGRAM PROBLEM SCOPE AREA (DELTA) (CCA, SAC, SJQ, SOL, STA, YOL)

Scientific name	County(ies)	Status
Listed species		
Amsinckia grandiflora large-flowered fiddleneck	**CCA***, **SJQ**	E
Cordylanthus maritimus ssp. *maritimus* salt marsh bird's-beak	**SOL**	E
Cordylanthus palmatus palmate-bracted bird's-beak	COL, FRE, MAD, **SJQ**, **YOL**	E
Erysimum capitatum ssp. *angustatum* Contra Costa wallflower	**CCA**	E
Oenothera deltoides ssp. *howellii* Antioch Dunes evening-primrose	**CCA**, **SAC**	E
Suaeda californica California sea blite	**SOL**	E
Tuctoria mucronata Solano grass	**SOL**, **YOL**	E
Proposed Species		
Arctostaphylos pallida pallid manzanita	**CCA**	PE
Castilleja campestris ssp. *succulenta* fleshy owl's clover	FRE, MAD, MER, **STA**	PT
Chamaesyce hooveri Hoover's spurge	BUT, GLE, **STA**, TEH	PT
Cirsium hydrophilum var. *hydrophilum* Suisun thistle	**SOL**	PE
Cordylanthus mollis ssp. *mollis* soft bird's-beak	**CCA**, NAP, **SOL**, SON	PE
Lasthenia conjugens Contra Costa goldfields	**CCA**, NAP, **SOL**	PE

Neostapfia colusana Colusa grass	COL, MER, **SOL**, **STA**, **YOL**	PT
Orcuttia inaequalis San Joaquin Valley Orcutt grass	FRE, MAD, MER, **STA**	PE
Orcuttia pilosa hairy Orcutt grass	BUT, GLE, MAD, MER, **STA**, TEH	PE
Orcuttia tenuis slender Orcutt grass	**SAC**, SHA, TEH	PT
Orcuttia viscida Sacramento Orcutt grass	**SAC**	PE
Pseudobahia bahiifolia Hartweg's golden sunburst	FRE, MAD, **STA**, SUT	PE
Trifolium amoenum showy Indian clover	NAP, **SOL**, SON	PE
Tuctoria greenei Greene's tuctoria	BUT, FRE, MAD, MER, **SJQ**, SHA, **STA**, TEH	PE
Candidate Species		
Holocarpha macradenia Santa Cruz tarweed	**CCA**	C
Species of Concern		
Aster lentus Suisun Marsh aster	**CCA**, NAP, **SAC**, **SJQ**, **SOL**	SC
Astragalus tener var. *ferrisiae* Ferris's milk-vetch	BUT, COL, **SOL**, SUT, **YOL**	SC
Astragalus tener var. *tener* alkali milk-vetch	**CCA**, MER, NAP, **SJQ**, **SOL**, SON, **STA**, **YOL**	SC
Atriplex cordulata heartscale	BUT, **CCA**, FRE, GLE. MAD, MER, **SJQ**, **SOL**, **STA**	SC
Atriplex depressa brittlescale	**CCA**, COL, FRE, GLE, MAD, MER, **SOL**, **STA**, **YOL**	SC

Atriplex joaquiniana valley spearscale	**CCA**, COL, GLE, MER, NAP, **SAC**, **SJQ**, **SOL**, **YOL**	SC
Atriplex persistens vernal pool saltbush	GLE, MER, **SOL?**, **STA**	SC
Calycadenia hooveri Hoover's rosinweed	MAD, MER, **STA**	SC
Campanula sharshmithae Mt. Hamilton harebell	**STA**	SC
Cirsium crassicaule slough thistle	**SJQ**	SC
Cirsium fontinale ssp. *campylon* Mt. Hamilton thistle	**STA**	SC
Clarkia rostrata beaked clarkia	MER, **STA**	SC
Cordylanthus mollis ssp. *hispidus* hispid bird's-beak	MER, **SOL**	SC
Cordylanthus nidularius Mt. Diablo bird's-beak	**CCA**	SC
Coreopsis hamiltonii Mt. Hamilton coreopsis	**STA**	SC
Delphinium californicum ssp. *interius* interior California larkspur	**CCA**, **SJQ**	SC
Delphinium recurvatum recurved larkspur	**CCA**, COL, FRE, MER, **SOL**	SC
Eriogonum nervulosum Snow Mountain buckwheat	COL, GLE, NAP, SON, **YOL**	SC
Eryngium racemosum delta coyote thistle	MER, **SJQ**, **STA**	SC
Eryngium pinnatisectum Tuolumne coyote thistle	**SAC**	SC
Eryngium spinosepalum spiny-sepaled coyote thistle	FRE, MAD, **STA**	SC
Eschscholzia rhombipetala diamond-petaled poppy	**CCA**, COL, **STA**	SC
Fritillaria falcata talus fritillary	**STA**	SC

Fritillaria liliacea fragrant fritillary	**CCA**, **SOL**, SON	SC
Fritillaria pluriflora adobe fritillary	BUT, COL, GLE, NAP, **SOL**, TEH, **YOL**	SC
Helianthella castanea Diablo rock-rose	**CCA**	SC
Hemizonia parryi ssp. *congdonii* pappose spikeweed	**CCA**, **SOL**	SC
Hesperolinon breweri Brewer's dwarf-flax	**CCA**, NAP, **SOL**	SC
Hesperolinon drymarioides drymaria dwarf-flax	COL, GLE, NAP, **YOL**	SC
Isocoma arguta Brewer's dwarf flax	**CCA**, **SOL**	SC
Juglans californica var. *hindsii* Northern California black walnut	**CCA**, NAP, **SAC**, **SOL**, **YOL**	SC
Juncus leiospermus var. *ahartii* Ahart's rush	BUT, **SAC**	SC
Lathyrus jepsonii var. *jepsonii* delta tule pea	**CCA**, FRE, NAP, **SAC**, **SJQ**, **SOL**	SC
Legenere limosa legenere	NAP, **SAC**, **SOL**, SON, **STA**, TEH	SC
Lilaeopsis masonii Madon's lilaeopsis	**CCA**, NAP, **SAC**, **SJQ**, **SOL**	SC
Lotus rubriflorus red-flowered lotus	COL, **STA**, THE	SC
Madia hallii Hall's madia	COL, NAP, **YOL**	SC
Monardella leucocephala Merced monardella	MER, **STA**	SC
Myosurus minimus ssp. *apus* little mousetail	BUT, **CCA**, COL, **SOL**, **STA**	SC
Perideridia gairdneri ssp. *gairdneri* Gairdner's yampah	NAP, **SOL**, SON	SC
Phacelia phacelioides Mt. Diablo phacelia	**CCA**, **STA**	SC

Sagittaria sanfordii Sanford's arrowhead	BUT, FRE, MER, **SAC**, **SJQ**, SHA, TEH	SC
Sanicula saxatilis rock sanicle	**CCA**	SC
Streptanthus albidus ssp. *peramoenus* most beautiful jewelflower	**CCA**	SC
Streptanthus hispidus Mt. Diablo jewelflower	**CCA**	SC
Tropidocarpum capparideum caper-fruited tropidocarpum	**CCA**, GLE, **SJQ**	SC

* Counties in bold are within the Problem Scope Area (CCA, SAC, SJQ, SOL, STA, YOL).

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