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Implementation Strategy to Identify Priorities for Bay-Delta Ecosystem Restoration

I. *PURPOSE OF IMPLEMENTATION STRATEGY*

This implementation strategy is being prepared for several purposes. The first is to guide the selection of projects and programs from the funding sources where CALFED has a direct role in decision-making. These funding sources include $60 million in state Proposition 204 funds and stakeholder contributions to fund the commitments in the Bay-Delta Accord, commonly referred to as Category III. In addition, the President's Budget for federal FY 98 proposes $143 million for Bay-Delta ecosystem restoration which will likely use a similar decision -making structure as Category III.

This implementation strategy is also being developed to maximize the cost sharing opportunities between CALFED/Category III and other funding sources. One of the initial priorities for coordination is the Central Valley Project Improvement Act. CVPIA staff have identified priority species for their anadromous fish programs which are closely aligned with this Implementation Strategy but which do not include the fish species resident in the delta because that is beyond their scope. In addition, many of the considerations CVPIA uses to prioritize projects have been incorporated into the criteria in this document. CALFED will continue to work to find ways to coordinate these two programs as well as the many other programs involved in the restoration of Bay-Delta ecosystem.

Revisions and Modifications. This implementation strategy will be used to guide expenditures over the next several years but will be re-examined on an annual basis to determine if there is the need to add additional species, habitat types or to revisit criteria. This will be especially important as federal funding under H.R. 4236 becomes available and as the programmatic EIR/EIS is completed allowing initiation of the ecosystem restoration activities identified in Chapter 7 of Prop 204. While it is appropriate to focus immediately on more limited portions of the overall Ecosystem Restoration Program, as the amount of available funding increases, there will be opportunities to expand this focus. This strategy will be reviewed and amended as needed semi-annually.

II. *BACKGROUND*

The mission of the CALFED Bay-Delta Program (CALFED) is to develop a long term comprehensive plan to restore ecosystem health and improve water management for beneficial uses of the Bay-Delta System. CALFED is also working to ensure that existing programs such as Category III, the Central Valley Improvement Act, and other ecosystem restoration efforts are implementing actions that are consistent with the long term plan including the Ecosystem Restoration Program.

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A. *Overview of the Ecosystem Restoration Program*

CALFED's Ecosystem Restoration Program goal is to "improve and increase aquatic and terrestrial habitats and improve ecosystem functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species". The program objectives are to:

- Improve and increase aquatic habitats so that they can support the sustainable production and survival of native and other desirable estuarine and anadromous fish in the estuary,
- Improve and increase important wetland habitats so that they can support the sustainable production and survival of wildlife species, and
- Increase population health and population size of Delta species to levels that ensure sustained survival.

The program is developing the implementation objectives and targets that will be needed to meet these goals and objectives. These targets are being set to address the ecosystem elements which include:

- Six physical processes such as sediment supply, fire, and the hydrograph,
- Twelve secondary ecosystem processes and functions such as water temperature, nutrient cycling, and gravel recruitment,
- Thirteen stressors such as contaminants, dredging, and land use practices,
- Fifteen habitat types such as valley oak woodland, open-ended sloughs, seasonal wetlands, tidal perennial aquatic habitat, and
- Forty-seven species and groups of species such as the California red-legged frog, the delta smelt, and estuarine foodweb organisms.

In the programmatic Environmental Impact Report/Statement being prepared by the CALFED Bay-Delta Program on the long-term plan, this large scale program will be described at the programmatic level which will not include detail on specific restoration actions. The individual actions will be implemented through adaptive management which involves implementing actions, monitoring and evaluating the results, and then adjusting the program accordingly.

B. *Relationship of Implementation Strategy to Ecosystem Restoration Program*

The overall Ecosystem Restoration Program will be implemented in phases over several decades. This implementation strategy is being developed in coordination with the development of phasing for the Ecosystem Restoration Program so that it flows logically into the long-term program. It should also provide the opportunity to begin to reduce the most critical conflicts in the Bay-Delta ecosystem and to initiate adaptive management.

C. *Overview of Central Valley Project Improvement Act Goals*

The CVPIA has three major goals.

- Double natural production of anadromous fish,
- Provide water for refuges, and
- mitigate for other CVP impacts.

CVPIA requires that specific projects' assurances be implemented by the Department of the Interior (DOI). It also includes a number of programs such as the Anadromous Fish Restoration Program, that allows the DOI to implement restoration actions, primarily to reach the doubling goal.

D. Overview of Category III Program

Category III was designed to fund non-flow actions to benefit fish species dependant on the Bay-Delta. Factors such as introduced species, fish screens, and toxics were to be addressed through these actions.

III. *IDENTIFICATION OF NEAR-TERM RESTORATION PRIORITIES*

Restoration priorities need to be established which are consistent with the objectives of the ERPP and with the original intent of Category III. On December 13, 1996, the Ecosystem Roundtable indicated that the priorities for allocating ecosystem restoration resources should be (1) actions to assist in the recovery of aquatic species that are listed, of special concern, or desirable and in "greatest need", and (2) actions to assist in the restoration of habitat types that have experienced the greatest decline, and which are important to the priority species. The Roundtable also indicated that where actions could also provide broad ecosystem restoration, they should be favored over actions which only benefitted a single species. The Roundtable emphasized an interest in funding habitat demonstration projects that can increase the understanding of large scale ecosystem restoration processes. At the February 20, 1997 meeting, the Ecosystem Roundtable made six additional changes. These were 1) inclusion of instream aquatic habitat as a specific priority habitat type, 2) identifying migratory birds as a secondary priority and moving striped bass into this secondary priority, 3) including fall run salmon in the east side Delta tributaries, 4) considering watershed actions when determining the best projects for restoring the identified priority species and habitats, 5) considering agricultural wetlands when determining the best projects for restoring the identified priority species and habitats, and 6) considering the south and central San Francisco Bay more comprehensively in future revisions of this Implementation Strategy but considering actions in these areas when determining the best projects for restoring the identified priority species and habitat types. Using the ERPP as a guiding document, this draft paper identifies the rationale for setting near term restoration priorities, and then identifies the restoration priorities based on that rationale. Criteria are also included that will help guide selection of actions to address the priority species and habitat types. The rationale that were used to select species and habitat types is as follows:

- CALFED Mission. Focus on species and habitat whose restoration will result in the greatest progress towards achieving the CALFED mission to restore ecological health and improve water management for beneficial uses of the Bay-Delta System. Aquatic species and those habitats supporting aquatic species would be priorities based on this criteria because the major issue in the Bay-Delta that led to the creation of CALFED centered on the conflicts between fisheries and water management.
- High Risk. Focus on desirable species and habitats that have experienced the greatest declines.
- Ecosystem Benefits. Focus on habitats that provide the broadest benefits to priority species and to the ecosystem.

III. *PHYSICAL AND ECOSYSTEM PROCESSES*

The CALFED ERPP is based on the premise that restoration of ecological processes and functions is a fundamental tool for successful ecosystem restoration. These natural processes serve to create and maintain habitats needed by fish, wildlife and plant communities. Restoration efforts based on restoration of natural processes are likely to be more cost effective in the long term because they should be self sustaining and require less human intervention. Restoration of processes such as hydrologic regime are also important if habitats such as tidal, perennial, and shaded riverine aquatic are to function. This premise will also be a basis for the early implementation program. However, it may not be feasible to restore some natural processes and active management may be needed to recreate their beneficial effects.

As watersheds are evaluated to identify limiting factors which may be affecting the priority species, they will also be evaluated to determine the status of important ecological processes and functions. Where these processes have been interrupted or altered so the needed habitats are no longer being provided, the feasibility of restoring those processes will be evaluated. If the processes can be restored through early implementation actions, those actions will be given preference. Where it is not feasible in the short term to restore the natural process, short term restoration actions should not preclude long term restoration of the processes. Where it is clear that the natural process cannot be restored, it may be necessary to take restoration actions that replace or supplement the natural process, knowing that these will be on-going annual maintenance types of programs.

IV. *HABITATS*

Habitat types that have experienced the greatest declines and which provide the broadest ecosystem benefits and/or benefits to the priority species include the following:

1. ***Tidal perennial aquatic habitat (freshwater).***
   Description. Includes shallow aquatic habitats, particularly less than 9 feet deep from mean high tide.
   Priority rationale: This habitat type has declined dramatically in the Delta. It provides habitat for many fish and wildlife species, and contributes to the primary and secondary productivity of the foodweb in the Delta. Implementation of pilot projects would allow restoration techniques to be refined. Experience restoring this type of habitat has been limited and there are questions related to benefits that can be provided for salmon rearing in the Delta that need to be answered as part of the larger ERPP.
   Examples: A project that is already underway, is the include Prospect Island Project.
   Key species: Species potentially benefitted by this habitat type include Delta smelt, salmon, wildlife and plant species in the following guilds: shorebird and wading-bird guild, waterfowl guild, freshwater emergent wetlands plant association.

2. ***Seasonal wetland and aquatic***

   Description: Includes seasonal wetland habitats within the floodplain which are

inundated seasonally by high water or seasonal wetland habitats which can be managed to recreate these natural processes.
Priority rationale: Seasonal wetlands within the floodplain can provide habitat for aquatic species such as splittail spawning and salmon rearing and for wildlife species such as waterfowl and shorebirds. They also provide functions such as nutrient cycling and foodweb support. Seasonal wetlands provide foraging and adjacent uplands provide nesting habitat for waterfowl and other water-dependant wildlife species, some of which are listed such as the greater sandhill crane, giant garter snake, California clapper rail, and Aleutian canada goose.. Historically, the Central Valley provided over four million acres of natural wetland habitat but this has been reduced by over 90%. Natural seasonal wetlands have been greatly reduced by levee construction for agricultural conversion and urbanization, significant changes in hydrology and water quality, and construction of flood control and navigation projects . In some areas, these changes have precluded the ability to restore seasonal wetlands through natural processes so they must now be recreated through intentional irrigation and management to provide the same wetland functions. In other areas, the natural processes are still capable of restoring seasonal wetlands with less management. Where possible, seasonal wetlands will be restored through natural processes and where necessary, they will be recreated through more intensive management. Restoration of seasonal wetlands can also provide opportunities for riparian forest restoration using natural processes if there is not a conflict with flood control operations.

Examples: The Yolo Bypass, the Cosumnes River Preserve/Watershed, and Stone Lakes Wildlife Refuge.
Key species: salmon, splittail, waterfowl and wading birds such as northern pintails and mallards, giant garter snakes, sandhill crane, California clapper rail, Aleutian Canada goose, tricolored blackbird, and for the areas where appropriate riparian upland restoration can accompany seasonal floodplain wetlands, grassland species such as western yellow-billed cuckoo, Swainson's hawk, riparian wildlife guild, and neotropical migratory bird guild can be benefitted.

3. Instream aquatic habitat
Description: Includes aquatic habitat in the creeks, streams, and rivers of the Central Valley. Components of this aquatic habitat includes the water flows, sediment supply, water quality, water temperature, and other parameters that interact to provide healthy aquatic habitat.
Priority rationale: This habitat type provides spawning and rearing habitat for most of the anadromous species in the Bay-Delta ecosystem. Native resident species also rely on this habitat type. It plays an important role in the health of estuarine habitat downstream. This habitat type has been impacted by changes in water and sediment supply, losses in riparian habitat discussed under shaded riverine aquatic habitat, changes in water quality and water temperature, and many other landscape level changes in the ecosystem.
Examples: Restoration efforts on Battle Creek to improve flows, gravel replenishment efforts on the Sacramento River, and CVPIA water acquisition efforts on the Merced River.
Key species: Salmonids, splittail, and striped bass.

4. Shaded riverine aquatic habitat

Description: Includes riparian habitat adjacent to or overhanging streams and rivers.
Priority rationale: This habitat type provides food and escape cover for outmigrating salmonid juveniles and is an important source of nutrients in the streams and delta sloughs. Much of this habitat type along the major rivers and in the delta has been lost due to river channelization, levee construction and maintenance, and the invasion of exotic flora. Shaded riverine aquatic habitat can been restored in two ways, through restoration on existing levee berms and through restoration of natural processes by modifying flood control facilities such as with levee setbacks. In giving this habitat type priority, the focus should be on restoration using natural river processes with habitat restoration on existing levee berms occurring only where natural process restoration is precluded.
Examples: Sacramento River Refuge/SB 1086, Cosumnes River Preserve
Key species: Salmonids, other riparian dependent species. ~~(NOTE: need to add additional detail)~~

5. ***Saline emergent wetlands habitat (tidal)***
Description: Includes tidal brackish and saltwater wetlands.
Priority rationale: This habitat type supports several listed plant and animal species and is important for nutrient cycling and foodweb support functions. It has also declined due to diking and reclamation of bay lands.
Examples: There are several restoration projects in the North Bay and Suisun Bay.
Key species: Salt marsh harvest mouse, Suisun song sparrow, California clapper rail, and for some of the restoration projects in the North Bay which restore natural salinity gradients at creek mouths, this type of restoration can be important for aquatic species such splittail and striped bass.

6. ***Midchannel islands and shoals habitat***
Description: Includes the channel islands in the Delta.
Priority rationale: These midchannel islands represent diverse habitat types including shoals, tidal mudflats, tule marshes, shaded riverine aquatic, and riparian scrub habitat. These habitat remnants are a high priority for protection and restoration because collectively they comprise a significant fraction of the remaining natural habitat in the Delta, they continue to be threatened, and they are one of the few habitat areas in many areas of the delta where habitat restoration opportunities have not been complicated by subsidence.
Examples: Staten Island midchannel island project
Key species: Delta smelt, salmon, shore bird and wading-bird guilds, and waterfowl guild.

7. ***~~North Delta~~ agricultural wetlands and perennial grasslands***
Description: Includes agricultural lands seasonally flooded and perennial grassland habitat.
Priority Rationale. Agricultural wetlands and perennial grasslands in the north Delta may also need to be included because they provide opportunities for restoration of seasonal floodplains and tidal perennial aquatic habitat due to the limited amount of subsidence that has occurred. These habitat types in the north delta are rapidly being converted to vineyards which could preclude opportunities

for restoration in the future. Other agricultural wetlands will be considered in determining the actions needed to address priority species.
Examples: Stone Lakes Wildlife Refuge, Jepson Prairie Preserve
Key Species: These habitat types in this area currently provide foraging habitat for shorebirds, waterfowl, Swainson's hawks, and sandhill cranes. Any future restoration of these lands would incorporate the existing terrestrial and avian wildlife benefits as well as provide benefits to aquatic species such as Dela smelt, and salmon.

V. *PRIORITY SPECIES OR POPULATIONS*

Species or populations that are at the greatest risk of decline and whose recovery contributes the greatest to the CALFED mission include the following aquatic species that are listed, are being considered or are likely to be considered for listing, or aquatic species with high recreational value and in serious decline. Using these species, the stressors or factors affecting them and the actions needed to address the stressors will be identified by technical experts. These actions will then be evaluated to ensure that they are consistent with the criteria included at the end of the Implementation Strategy. Evaluate to see if, for example, actions which only benefit striped bass and which adversely affect another species in the estuary would be inconsistent with the criteria.

- San Joaquin River fall run chinook salmon
- Winter-run chinook salmon
- Spring-run chinook salmon
- Delta smelt
- Splittail
- Steelhead trout
- Green sturgeon

Other species to be considered:

- Striped bass
- Migratory birds

1. ***San Joaquin River fall-run chinook salmon:*** The chinook salmon is an important native anadromous sport and commercial fish with important ecological value. The fall-run race on the San Joaquin River is designated as a species of concern by USFWS.

2. ***Winter-run chinook salmon:*** The chinook salmon is an important native anadromous sport and commercial fish with important ecological value. The winter-run race is listed as endangered under the state and federal Endangered Species Acts.

3. ***Spring-run chinook salmon:*** The chinook salmon is an important native anadromous sport and commercial fish with important ecological value. The spring-run race on the Sacramento River is designated as a closely monitored species by DFG and a species of concern by USFWS.

4. ***Delta smelt:*** The delta smelt is a native estuarine resident fish that has been listed as threatened under the state and federal Endangered Species Acts.

5. ***Splittail:*** The Sacramento splittail is a native resident fish that is proposed for listing

under the federal Endangered Species Act and a candidate for listing under the State Endangered Species Act. The Sacramento splittail also supports a small winter sport fishery in the lower Sacramento River.

6. ***Steelhead trout:*** The steelhead trout is an important native anadromous sport fish of high recreational and ecological value that is proposed for listing under the federal Endangered Species Act.

7. ***Green sturgeon:*** The green sturgeon is designated as a species of special concern by DFG and a species of concern by USFWS.

8. ***Striped bass:*** The striped bass is an important non-native anadromous sport fish with high recreational value. It also plays an important role as a top predator in the aquatic system.

9. ***Migratory Birds:*** Includes both waterfowl guild and neotropical migratory bird guild. Many of these species migrate through, winter or breed in the Bay-Delta. Waterfowl are a significant component of the ecosystem, are of high interest to recreational hunters and bird watchers, and contribute to California's economy. Representative species include canvasback, mallards, and snow geese. The neotropical migratory bird guild are of high interest to recreational bird watches and there have been substantial losses of habitat used by these species.

VI. *GEOGRAPHIC DISTRIBUTION OF PRIORITIES*

The geographic distribution of the five habitat types and the eight species or population priorities are shown in Table 1 and 2. Using these habitat types and species as priorities will result in a fairly broad geographic distribution of projects and resources. Therefore, no additional geographic priorities have been established at this time.

Table 1. Geographic Distribution of Priority Habitat Types

	North Bay	Delta	Sacramento	Sacramento Tributaries	San Joaquin	San Joaquin Tributaries
Tidal Freshwater		x				
Seasonal floodplain wetlands	x	x	x	x	x	x
Shaded Riverine	x	x	x	x	x	x
Saline Tidal/ emergent	x					
Mid-channel islands		x				
Instream Aquatic Habitat			x	x	x	x

Table 2. Geographic Distribution of Priority Species Likely Actions to Address									
	North Bay	Delta	Sacramento	American	Feather/ Yuba	smaller tributaries	San Joaquin	San Joaquin Tributaries	Ocean
San Joaquin Fall Run		x					x	x	x
Winter Run		x	x						x
Spring Run		x	x		x	x			x
delta smelt	x	x	x						
splittatil	x	x	x				x	x	
steelhead	x	x	x	x	x	x	?	?	x
green sturgeon	x	x	x						x
striped bass	x	x	x				x		x
Migratory birds	x	x	x	x	x	x	x	x	

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VIII. *WATERSHED MANAGEMENT*

Watershed management actions are an important part of the Ecosystem Restoration Program Plan. These types of actions will be incorporated where they address factors which limit or affect the restoration of priority species and habitats.

IX. *CRITERIA*

In addition to the rationale for identifying the priority species and habitats (see pg 2), criteria have been identified to address technical and policy objectives. These criteria are summarized in Table 3. They will be used to guide selection of actions to address the priority species and habitats.

Table 3. Draft Criteria List for Selection of Restoration Actions

1.	Restoration actions should not prejudge the selection of alternatives in CALFED's Programmatic EIR/EIS.
2.	Restoration actions should be consistent with CALFED mission, solution principles, goals, and objectives.
3.	Restoration actions should be amenable to evaluation and documentation of effects.
4.	Restoration actions which also benefit other CALFED program objectives for the Bay-Delta should receive additional priority..
5.	Restoration actions which provide both short-term and long-term benefits should be emphasized over actions which provide only short-term benefits.
6.	Restoration actions should emphasize restoration of natural processes and functions where possible.
7.	Restoration actions should address the elimination or reduction of limiting factors for priority species.
8.	Restoration actions which benefit a suite of species that includes listed species should be emphasized over actions that benefit any single priority species.
9.	Restoration actions for key species should not compromise other desirable species.
10.	Demonstration projects should be emphasized to reduce the uncertainty associated with the success of restoration actions, such as of ecosystem processes.
11.	Restoration actions that foster partnerships, collaboration, and/or information exchange should be encouraged.
12.	Restoration actions which may be precluded in the future due to land use transition or other changes, should receive priority.
13.	Where it is clear that a restoration action will provide benefits, implement it.
14.	Where it is clear there is an objective that needs to be met, but the exact restoration action is uncertain, conduct a management experiment with targeted monitoring and research.
15.	Where the objective is uncertain, proceed along two parallel paths. First, implement any "no regrets" actions that will improve the current situation. Second, conduct directed research and monitoring to reduce uncertainty about the objective and restoration actions needed to achieve it.