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Ecosystem Restoration Strategy
CALFED Bay-Delta Program

The primary ecosystem quality objective of the CALFED Bay-Delta Program is to "Improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species." The Program's strategy to achieve this objective is to reverse the decline in ecosystem health by reducing or eliminating factors which degrade habitat, impair ecological functions, or reduce the population size or health of species. These factors may cause direct mortality of plants and animals in the system, but more often they result in indirect mortality by degrading habitat conditions or functions. For this reason, the Program objectives emphasize the improvement of habitats and ecological functions.

When there is a single factor limiting an ecological function or the population size or health of a species, remedial actions to restore functions or populations are clear. Often, however, there are many factors that reduce ecological functions or cause mortality of species at different stages in the life cycle. In the Bay-Delta system, some of these include inadequate physical habitat that fails to provide areas for reproduction, foraging, or escaping from predators; inadequate water quality including temperature and toxic contaminants; fragmented habitat that impedes migration; inadequate or altered water flow regimes; direct and indirect mortality caused by water diversions from the system; presence of undesirable introduced species that compete with or prey upon other species; and recreational and commercial harvest. In cases where there are multiple factors affecting species, the strategy of the program is to make incremental improvements in all the significant identified factors that affect important species and their habitats.

Several criteria will help to focus efforts aimed at achieving ecosystem quality objectives:

Address Limiting Factors. To the extent that a single limiting factor can be identified for a species or race, actions will be designed to overcome the limiting factor. This will result in the most efficient use of limited resources for restoration.

Use Natural Processes. Selection of actions will favor those that take advantage of natural processes to achieve desired results. This will reduce the amount of effort to carry out and maintain our actions, and increase the likelihood of long-term sustainability of the Bay-Delta system.

Increase Resilience. Actions will be selected so that some of the system's natural resilience to disturbance is restored. Restoration of particular habitat types will be undertaken at appropriate sites distributed throughout the system, and genetic diversity will be protected so that species

Similarly, actions to improve one factor throughout the system will emphasize protecting the most vulnerable species, achieving multi-species benefits, and increasing resilience by restoring habitat at appropriate sites distributed throughout the system. For instance, detailed criteria will be developed to ensure that fish screens are installed on diversions where the greatest benefit will be derived. Restoration of shaded riverine aquatic habitat will be focused on migration routes for anadromous fish and areas where anadromous as well as Delta native fish will benefit. Restoration of shallow water habitat in the Delta will emphasize areas where multiple species will benefit and where other factors such as water diversions are least likely to affect population size.

The Program's ecosystem restoration strategy is leading to the development of alternatives through the following steps:

- A comprehensive description of the problems affecting the ecosystem was developed at two public workshops.

- The problems were converted into an overall objective, a set of primary objectives and a set of secondary objectives. Again, this was the subject of public workshops.

- The objectives were used to identify actions which would meet or help meet the objectives. The actions were then compared to existing plans or programs, like the Central Valley Project Improvement Act or the Upper Sacramento River Riparian and Anadromous Fishes Program to see where existing or planned activities could be incorporated into CALFED alternatives. The actions were also evaluated for opportunities for linkage with other actions developed for other aspects of the CALFED comprehensive planning effort. For example, actions to increase shallow aquatic habitat in the Delta were linked to levee restoration actions.

- Ecosystem restoration components were developed for the draft preliminary alternatives. These were developed by matching the objectives with actions in existing restoration programs or other identified actions. The ecosystem restoration components were developed to complement other components of the alternatives.

As the draft preliminary alternatives are being refined, a method of staging the actions is being developed. Staging of actions, like selection of actions, will be guided in part by the criteria listed above. Priority will be given to actions that address limiting factors, those that increase resilience, and those that achieve multiple benefits.

A final step in the process will be the adoption of a suite of indicators of ecosystem health. These indicators will be used to measure progress and, in conjunction with monitoring, will provide support for adaptive management decisions.

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