

**CALFED Bay-Delta Program**  
**Draft FY 2000 Priorities for Ecosystem Restoration**  
**9/2/99**

**Priorities in the Delta:**

**Creation and Evaluation of the Ecological Benefits of Fresh Emergent Wetland Habitat in the South Delta**

Entrainment of native fish species at the State and Federal Delta pumping facilities is a significant problem that may be abated by a variety of actions including a consolidated point of diversion, new fish screens at the point of diversion, use of water through the Environmental Water Account to allow reduced diversions at critical stages to protect native fishes, and enlarged channel capacities to reduce flow velocities toward the Delta diversion facilities.

A significant ecological uncertainty is associated with the role and value of fresh emergent wetland habitat in the South Delta in providing forage, rearing and protective habitats and in reducing the probability that fish will be entrained. Emergent wetland habitat areas will be designed and created in the South Delta as an adaptive experiment using all available tools including conceptual models, hypothesis testing, and comprehensive monitoring.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals<sup>1</sup>

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.
2. Rehabilitate natural processes in the Bay-Delta system to support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities, in ways that favor native members of those communities.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.

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<sup>1</sup>The 1999 PSP Funding Priorities are the same as the CALFED ecosystem restoration goals contained within the June 1999 Strategic Plan for Ecosystem Restoration.

4. Protect or restore functional habitat types throughout the watershed for public values such as recreation, scientific research and aesthetics.
5. Prevent establishment of additional non-native species and reduce the negative biological and economic impacts of established non-native species.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties:

6. Shallow Water Tidal and Freshwater Marsh Habitat
11. Diversion Effects of Pumps

This priority is consistent with the Sacramento-San Joaquin Delta Ecological Management Zone Vision (South Delta EMU) ecological restoration targets for:

- Nontidal Perennial Aquatic Habitat (ERP Vol. II, pg. 90,91)
- Fresh Emergent Wetland Habitat (Nontidal) (ERP Vol. II, pg. 93)
- Riparian and Riverine Aquatic Habitats (ERP Vol. II, pg. 95,96)

CALFED will evaluate proposed projects based on their ability to:

- Create or maintain tidally influenced fresh emergent wetland habitats along major conveyance routes to the Delta pumping facilities
- Link with previously conducted efforts or is a continuation of a successfully implemented project
- Provide an opportunity to develop the project as an adaptive experiment including conceptual models, testable hypotheses, and comprehensive monitoring
- Contribute to resolution of some of the ecological uncertainties related to creating tidally influenced wetlands in the Delta.

## Restore Tidal Habitats Along Georgiana Slough

Georgiana Slough is a natural distributary of the Sacramento River. It carries Sacramento River water to the interior of the Delta. When state and federal water project exports are high, unnaturally high volumes of Sacramento River water are drawn into the interior of the Delta. This highly modified hydraulic action exposes young fish of Sacramento River origin to high rates of predation and entrainment loss. The loss of escape cover and other aquatic habitats along Georgiana Slough increases the problem. The absence of habitat has been attributed to levee construction, boat wakes and increased flow velocities entering the Central Delta through Georgiana Slough.

The approach is to create a mosaic of riparian and riverine aquatic and tidally influenced fresh emergent wetland habitats along Georgiana Slough to provide direct benefits to fish species

rearing or migration through the slough. The restoration actions will be designed and implemented as adaptive experiments complete with comprehensive monitoring for the dual purposes of helping to restore listed species while resolving some of the ecological uncertainty linked to the role of riparian and riverine aquatic and fresh emergent wetland habitats in the survival of young fish.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.
2. Rehabilitate natural processes in the Bay-Delta system to support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities, in ways that favor native members of those communities.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.
4. Protect or restore functional habitat types throughout the watershed for public values such as recreation, scientific research and aesthetics.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties:

3. Channel Dynamics, Sediment Transport and Riparian Vegetation
6. Shallow Water Tidal and Freshwater Marsh Habitat
8. Limiting Factors
11. Diversion Effects of Pumps
12. The Importance of the Delta for Salmon

This priority is consistent with the Sacramento-San Joaquin Delta Ecological Management Zone Vision (East Delta EMU) ecological restoration targets for:

- Delta Sloughs (ERP Vol. II, pg. 91)
- Fresh Emergent Wetland Habitat (Tidal) (ERP Vol. II, pg. 92,93)
- Fresh Emergent Wetland Habitat (Nontidal) (ERP Vol. II, pg. 93)
- Riparian and Riverine Aquatic Habitat (ERP Vol. II, pg. 95,96)
- Predation and Competition (ERP Vol. II, pg. 105)

CALFED will evaluate proposed projects based on their ability to:

- Identify potential sites for restoration experiments
- Create or maintain shallow water and riparian habitats through setback levees

- Link with previously conducted efforts or is a continuation of a successfully implemented project
- Provide an opportunity to develop projects as an adaptive experiments including conceptual models, testable hypotheses, and comprehensive monitoring
- Contribute to resolution of some of the ecological uncertainties related to the role and value of riparian and riverine aquatic and fresh emergent wetland habitats along Georgiana Slough.

## Ecosystem Restoration Levee Setback Feasibility Study

A major component of the Ecosystem Restoration Program Plan is the creation of shallow, tidally influenced aquatic habitat in the Delta. The approach is to implement actions and studies that will resolve the ecological and technical uncertainties associated with levee setback actions to create tidally influenced shallow water habitats. Resolution is needed early in the program so that the long-term effort can be refined based on improved scientific information. Resolution will be achieved by geotechnical and engineering analysis to establish feasibility and estimated costs associated with levee realignments.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.
2. Rehabilitate natural processes in the Bay-Delta system to support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities, in ways that favor native members of those communities.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.
4. Protect or restore functional habitat types throughout the watershed for public values such as recreation, scientific research and aesthetics.
5. Prevent establishment of additional non-native species and reduce the negative biological and economic impacts of established non-native species.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties:

6. Shallow Water Tidal and Freshwater Marsh Habitat
11. Diversion Effects of Pumps

This priority is consistent with the Sacramento-San Joaquin Delta Ecological Management Zone Vision (All Delta EMU's) ecological restoration targets for:

- Delta Channel Hydraulics (ERP Vol. II, pg. 86,87)
- Fresh Emergent Wetland Habitat (Tidal) (ERP Vol. II, pg. 92)
- Riparian and Riverine Aquatic Habitat (ERP Vol. II, pg. 95,96)

CALFED will evaluate proposed projects based on their ability to:

- create or maintain fresh emergent wetland and riparian and riverine aquatic habitats through levee setbacks or fill of deep water areas
- Link with previously conducted efforts or is a continuation of a successfully implemented project
- Provide an opportunity to develop the project as an adaptive experiment including conceptual models, testable hypotheses, and comprehensive monitoring
- Contribute to resolution of some of the ecological uncertainties related to integrating levee and habitat improvements in the Delta.

## Evaluate the Need to Screen Small Diversions in the South Delta

There are a large number of relatively small diversions diverting water from the South Delta. These smaller diversions have the potential to entrain juvenile fish, but there is relatively little data that can be used to identify where the biological benefits would be of the greatest benefit in a program to screen smaller diversions. Evaluations of alternative methods of preventing entrainment at larger diversions have not identified any effective solutions other than positive barrier fish screens. However, when evaluating screening at smaller diversions less than 25 cfs, there may be other techniques for preventing entrainment that could be cost effective in some situations.

Unlike the riverine environment where unscreened diversions may affect a large portion of fish populations, the benefits of screening small diversions in the South Delta is unknown. An evaluation should be undertaken to identify diversion effects on species and locations in the Delta and to identify locations where screening small diversions would be a high priority.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties:

#### 11. Diversion Effects of Pumps

This priority is consistent with the Sacramento-San Joaquin Delta Ecological Management Zone Vision (South Delta EMU) ecological restoration targets for:

- Water Diversions (ERP Vol. II, pg. 102)

Two general topics are recommended for evaluation: synthesis of existing information on entrainment in the Delta at small diversions and evaluation of entrainment effects at actual diversions if willing landowners can be identified. The approach is to determine the biological benefits of screening small diversions in a tidal environment and the technical feasibility of doing so.

CALFED will evaluate proposed projects based on their ability to:

- Consolidate existing information regarding the loss of native fish in small unscreened diversions
- Consolidate existing information regarding methods or techniques to install and operate screens on small diversions in the South Delta
- Link with previously conducted efforts or is a continuation of a successfully implemented project
- Provide an opportunity to develop the project as an adaptive experiment including conceptual models, testable hypotheses, and comprehensive monitoring
- Contribute to resolution of some of the ecological uncertainties related to small unscreened diversions in the South Delta.

### **Priorities for Major Floodplain Corridors Adjoining the Delta:**

#### **Integrate Ecosystem and Flood Control Improvements in the Lower Mokelumne River**

The Mokelumne River corridor is one of four major habitat corridors proposed in the Ecosystem Restoration Program Plan for the Sacramento-San Joaquin Delta Ecological Management Zone. Acquisition of land for future conversion to a variety of aquatic habitats are the major focus of recently completed actions in the area. These actions are closely linked with programs and projects identified in the Long-Term Levee Protection Plan. Together, actions from these two common programs can provide significant ecological benefits including increased riparian and riverine aquatic habitats, ecologically beneficial floodplain configurations, and improved habitats for fish spawning, rearing, and migration.

The approach is to implement adaptive experiments designed to contribute to the restoration of

listed fish species, improve habitat for a wide variety of other aquatic and terrestrial species, improve river-floodplain interactions and flood protection by setting back levees, and resolve ecological uncertainty by implementing a comprehensive monitoring and research program.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.
2. Rehabilitate natural processes in the Bay-Delta system to support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities, in ways that favor native members of those communities.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.
4. Protect or restore functional habitat types throughout the watershed for public values such as recreation, scientific research and aesthetics.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties

2. Natural Flow Regimes
3. Channel Dynamics, Sediment Transport, and Riparian Vegetation
4. Flood Management as an Ecosystem Tool
10. Decline in Productivity

This priority is consistent with the Sacramento-San Joaquin Delta Ecological Management Zone Vision (East Delta EMU) ecological restoration targets for:

- Natural Floodplain and Flood Processes (ERP Vol. II, pg. 85)
- Riparian and Riverine Aquatic Habitats (ERP Vol. II, pg. 95,96)
- Agricultural Lands (ERP Vol. II, pg. 98)
- Bay-Delta Aquatic Foodweb (ERP Vol. II, pg. 88)
- Tidal Perennial Aquatic Habitat (ERP Vol. II, pg. 89)
- Fresh Emergent Wetland Habitat (Nontidal) (ERP Vol. II, pg. 93)
- Seasonal Wetland Habitat (ERP Vol. II, pg. 94)

CALFED will evaluate proposed projects based on their ability to:

- Convert land to a variety of riparian and riverine aquatic habitats and tidally influenced fresh emergent wetland and tidal perennial aquatic (open water) habitats while providing improved flood protection in the form of wider floodplains and setback levees

- Link with previously conducted efforts or is a continuation of a successfully implemented project
- Create new habitats as adaptive experiments complete with conceptual models, hypotheses, and comprehensive monitoring
- Contribute to resolution of some of the ecological uncertainties related to integrating flood control and ecosystem improvements.

## Provide Needs and Opportunities Analysis for Improving Ecosystem Restoration and Flood Bypass habitat in the Yolo Bypass Area

Recent investigations indicate that the Yolo Bypass acts as a surrogate or alternative for natural floodplain habitat. When the bypass is operating, it effectively doubles the floodplain habitat of the Bay-Delta system. Field studies have demonstrated that the bypass supports at least 40 species of fish including delta smelt, steelhead trout, sturgeon, and chinook salmon including spring-run and winter-run chinook. The bypass appears to be particularly valuable habitat for the Sacramento splittail. It is hypothesized that the seasonal nature of the habitat serves the needs of native species and can provide a competitive advantage over non-native introduced species.

The bypass also appears to be an important link in the estuarine food chain. During periods of high flows, the bypass is a primary pathway for organic carbon to the estuary, a pathway that does not affect drinking water supplies.

The goal of the project is to complete an analysis of alternative ways to increase the frequency and duration of Yolo Bypass flooding while maintaining agricultural production and without encroaching on flood capacity. The approach is to design and implement a series of adaptive experiments to expand or enhance seasonal shallow-water habitats in the Yolo Bypass and near Delta floodplain. Habitat creation in the Yolo Bypass presents one of the best opportunities for ecosystem restoration because large areas of habitat can potentially be created at relatively small cost while retaining the flood management functions of the bypass.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.
2. Rehabilitate natural processes in the Bay-Delta system to support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities, in ways that favor native members of those communities.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.

4. Protect or restore functional habitat types throughout the watershed for public values such as recreation, scientific research and aesthetics.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties

2. Natural Flow Regimes
3. Channel Dynamics, Sediment Transport, and Riparian Vegetation
4. Flood Management as an Ecosystem Tool
5. Bypasses as Habitat
10. Decline in Productivity
12. The Importance of the Delta for Salmon

This priority is consistent with the Sacramento-San Joaquin Delta Ecological Management Zone Vision (North Delta EMU) ecological restoration targets for:

- Natural Floodplain and Flood Processes (ERP Vol. II, pg. 85)
- Riparian and Riverine Aquatic Habitats (ERP Vol. II, pg. 95,96)
- Agricultural Lands (ERP Vol. II, pg. 98)
- Delta Channel Hydraulics (ERP Vol. II, pg. 86,87,88)
- Bay-Delta Aquatic Foodweb (ERP Vol. II, pg. 88)
- Tidal Perennial Aquatic Habitat (ERP Vol. II, pg. 89)
- Fresh Emergent Wetland Habitat (Nontidal) (ERP Vol. II, pg. 93)
- Seasonal Wetland Habitat (ERP Vol. II, pg. 94)

CALFED will evaluate proposed projects based on their ability to:

- Maintain the flood flow capacity of the bypass
- Establish local government, agricultural, stakeholder, and agency support
- Link with previously conducted efforts or is a continuation of a successfully implemented project
- Provide an opportunity to develop the project as an adaptive experiment including conceptual models, testable hypotheses, and comprehensive monitoring
- Contribute to resolution of some of the ecological uncertainties related to the ecological value of season shallow-water habitat.

## San Joaquin River Floodplain Corridor

The San Joaquin River and its tributaries once supplied the bulk of nutrients and sediments to the Delta. The San Joaquin River overflowed its channel and moved on to the vast floodplain of the San Joaquin Valley. Nutrients to support the Delta foodweb and sediment to build habitats were transported to the Delta. These ecological processes seldom occur now. Water development and flood management have substantially reduced natural overbank flooding along the San Joaquin River.

The approach for the San Joaquin floodplain corridor is to integrate ecosystem restoration actions with flood damage reduction by establishing or improving floodplain interactions along the San Joaquin River and its tributaries. Flow or flowage easements would be acquired and agricultural production would continue, but instead of building flood levees or storage facilities, landowners would be compensated for allowing their land to flood. In this manner, a surrogate for the natural floodplain process could be established.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.
2. Rehabilitate natural processes in the Bay-Delta system to support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities, in ways that favor native members of those communities.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.
4. Protect or restore functional habitat types throughout the watershed for public values such as recreation, scientific research and aesthetics.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties

2. Natural Flow Regimes
3. Channel Dynamics, Sediment Transport, and Riparian Vegetation
4. Flood Management as an Ecosystem Tool
5. Bypasses as Habitat
10. Decline in Productivity
11. Diversion Effects of Pumps
12. The Importance of the Delta for Salmon

This priority is consistent with the San Joaquin River Ecological Management Zone Vision (Vernalis to Merced River EMU) and Sacramento-San Joaquin Delta Ecological Management Zone Vision (South Delta EMU) ecological restoration targets for:

- Delta Channel Hydraulics (ERP Vol. II, pg. 86,87,88)
- Bay-Delta Aquatic Foodweb (ERP Vol. II, pg. 88)
- Tidal Perennial Aquatic Habitat (ERP Vol. II, pg. 89)
- Fresh Emergent Wetland Habitat (Nontidal) (ERP Vol. II, pg. 93)
- Seasonal Wetland Habitat (ERP Vol. II, pg. 94)

- Natural Floodplain and Flood Processes (ERP Vol. II, pg. 398)
- Riparian and Riverine Aquatic Habitats (ERP Vol. II, pg. 400)
- Agricultural Lands (ERP Vol. II, pg. 401)

CALFED will evaluate proposed projects based on their ability to:

- Contribute to the restoration of San Joaquin River floodplain
- Provide seasonally inundated habitat such as flood bypasses
- Acquire floodplain through conservation easements or direct purchase
- Link with previously conducted efforts or is a continuation of a successfully implemented project
- Provide an opportunity to develop and implement the project as an adaptive experiment including conceptual models, testable hypotheses, and comprehensive monitoring
- Contribute to resolution of some of the ecological uncertainties related to improving and increasing floodplain habitats in the system.

## **System-wide Priorities:**

### **Develop a Long-Term Plan for In-stream Flows and Environmental Water Purchases**

The volume and timing of streamflows in the Central Valley have been substantially altered. Wetted habitat area has been reduced and environmental cues and migration flows have diminished. Flow fluctuations due to dam and power operations strand and kill young fish. Reduced flows often result in elevated water temperatures. The Ecosystem Restoration Program has identified the need to augment flows on streams tributary to the Delta by about 400,000 acre-feet annually.

The allocation of water for in-stream flow is one of the most contentious actions proposed by the Ecosystem Restoration Program. Because the plan calls for obtaining water from willing sellers and new supplies, it will be costly. At present, there is inadequate scientific consensus as to how in-stream flow needs for a broad range of ecological processes and functions should be determined. Hydraulic models are not available and comprehensive strategies cannot yet be developed.

The approach is to formulate a science-based method to determine in-stream flow needs for ecological processes, habitats, and species and to develop the modeling tools necessary to support a comprehensive ecological water management strategy. The management strategy will be firmly rooted in adaptive management. Water acquisition will include the acquisition of water rights, developing surface and groundwater storage, developing conjunctive use of groundwater, funding water conservation and purchasing water on the spot market or purchasing options. Each of these tools or opportunities will be required to reach the long-term objective of streamflow augmentation.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals:

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay as the first step toward establishing large, self-sustaining populations of these species; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.
2. Rehabilitate natural processes in the Bay-Delta system to support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities, in ways that favor native members of those communities.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.
4. Protect or restore functional habitat types throughout the watershed for public values such as recreation, scientific research and aesthetics.
5. Prevent establishment of additional non-native species and reduce the negative biological and economic impacts of established non-native species.
6. Improve and maintain water and sediment quality to eliminate, to the extent possible, toxic impacts on organisms in the system, including humans.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties:

2. Natural Flow Regimes
3. Channel Dynamics, Sediment Transport, and Riparian Vegetation
8. Limiting Factors
9. X2 Relationships

This priority is consistent with the ecological restoration targets for all of the Ecological Zones, and provides broad ecological benefits to many at risk species and habitats.

CALFED will evaluate proposed projects on the ability to:

- Contribute to resolution of some of the ecological uncertainties related to instream flows and the requirements of ecological processes, habitats, and species.
- Provide an opportunity to develop projects as adaptive experiments including conceptual models, testable hypotheses, and comprehensive monitoring.
- Establish support of local governments
- Provide long-term water supplies to augment existing flows
- Provide water at ecologically important times
- Provide an opportunity to exchange water to improve ecological conditions or flows

## Watershed Management

Watershed management actions can shift the timing of flows, increase base flows, and reduce peak flows. Healthy watersheds are a key to providing the flows and the types of habitats required by aquatic and terrestrial species. Integrating watershed management and restoration actions into the overall approach to improve ecosystem health is a key element to the success of the program.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals:

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay as the first step toward establishing large, self-sustaining populations of these species; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.
2. Rehabilitate natural processes in the Bay-Delta system to support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities, in ways that favor native members of those communities.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.
4. Protect or restore functional habitat types throughout the watershed for public values such as recreation, scientific research and aesthetics.
5. Prevent establishment of additional non-native species and reduce the negative biological and economic impacts of established non-native species.
6. Improve and maintain water and sediment quality to eliminate, to the extent possible, toxic impacts on organisms in the system, including humans.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties:

1. Introduced Species
3. Channel Dynamics, Sediment Transport and Riparian Vegetation
7. Contaminants in the Central Valley
8. Limiting Factors
10. Decline in Productivity

This priority is consistent with the ecological restoration targets for all of the Ecological Zones, and provides broad ecological benefits to many at risk species and habitats.

CALFED will evaluate proposed projects based on their ability to:

- Improve coordination and assistance including a broad array of collaborators comprised of landowners, local groups, and all levels of government
- Develop monitoring protocols and apply adaptive management processes including a comprehensive element that will be compatible with the IEP monitoring effort in the Delta
- Improve and expand watershed education and public outreach including training to stewardship groups regarding watershed evaluation and monitoring, and implementation techniques
- Improve watershed stewardship by establishing demonstration sited for floodplain wetland restoration, and riparian corridor redevelopment including exotic species removal
- Link with previously conducted efforts or is a continuation of successfully implemented watershed projects
- Contribute to resolution of some of the ecological uncertainties related to restoring watershed health.

## Cache Creek Mercury Source Control

Mercury-bearing ores are found throughout the upper Cache Creek watershed. These ore deposits are associated with geothermal springs and historic mines, both of which provide pathways for mercury to enter Cache Creek. Organic forms of mercury (including methylmercury) can be easily taken up into the food chain by aquatic insects. Mercury is monitored in the basin by Yolo County, Regional Water Quality Control Board, U.S. Geological Survey, and the U.S. Fish and Wildlife Service.

Monitoring in 1997 indicated that highly elevated mercury levels were present in several sub-drainages between Clear Lake and Rumsey. For example, Harley Gulch, Davis Creek and Bear Creek exhibited high mercury levels, presumably from known mercury mine sites or a stream draining a mercury mining zone.

The approach is to collaborate with ongoing investigations and the County of Yolo to identify known mercury contamination sources that could be subject to remediation through adaptive intervention. This effort would be consistent with the Cache Creek Resources Management Plan and the Cache Creek Improvement Program.

This priority is consistent with these June 1999 Strategic Plan for Ecosystem Restoration Goals:

1. Achieve recovery of at-risk native species dependent on the Delta and Suisun Bay as the first step toward establishing large, self-sustaining populations of these species; support similar recovery of at-risk native species in San Francisco Bay and the watershed above the estuary; and minimize the need for future endangered species listings by reversing downward population trends of native species that are not listed.

2. Rehabilitate natural processes in the Bay-Delta system to support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities, in ways that favor native members of those communities.
3. Maintain and enhance populations of selected species for sustainable commercial and recreational harvest, consistent with goals 1 and 2.
6. Improve and maintain water and sediment quality to eliminate, to the extent possible, toxic impacts on organisms in the system, including humans.

This priority is consistent with gaining more information about these Strategic Plan Critical Uncertainties:

7. Contaminants in the Central Valley
8. Limiting Factors
10. Decline in Productivity

This priority is consistent with the Yolo Basin Ecological Management Zone Vision (Cache Creek EMU) ecological restoration targets for:

- Contaminants (ERP Vol. II, pg. 352)

CALFED will evaluate proposed projects based on their ability to:

- Establish local government, stakeholder, and public support
- Link with previously conducted efforts or is a continuation of a successfully implemented project
- Provide opportunities to develop projects as an adaptive experiments including conceptual models, testable hypotheses, and comprehensive monitoring
- Contribute to resolution of some of the ecological uncertainties related to mercury in the aquatic environment.

## **Provide Subsequent Phase Funding for Ecosystem Restoration Projects that have Received Previous Funding**

CALFED has previously funded many ecosystem restoration projects. Many of these were funded in phases and are ongoing or nearing completion. The strategy is to fully review the results of the earlier phases of multi-part projects to assess their technical or scientific merits, determine if project implementation is consistent with annual priorities and implementation of the long-term plan, and provide next phase or development funding if appropriate.

In addition, consistent with the recommendation of the Strategic Plan for Ecosystem Restoration CALFED is proposing to identify several watersheds as "demonstration watersheds". These include Butte, Deer and Clear Creeks and the Tuolumne River. These areas were selected based

on their unique characteristics, their potential to provide both scientific information and ecosystem benefits and the past efforts that have been funded. Information gained in the demonstration watersheds will be transferable to similar watersheds and reduce much of the ecological uncertainty related to the overall long-term program.

Continuation of program efforts such as the Non-native Invasive Species Program administered by the USFWS for CALFED would also be included in this priority.

## **Agricultural Issues**

Productive agricultural lands and practices have a tremendous influence on natural habitats in the Bay-Delta watershed. Protecting and enhancing agricultural lands for wildlife purposes is an important part of the CALFED Program. The continuation of agricultural practices on restoration lands such as preserves or wildlife refuges protects these areas from urban development, maintains agricultural use and infrastructure and provides wildlife benefits. Over two-thirds of agricultural land affected by the CALFED Restoration Coordination Program to date have been maintained to some degree in agricultural use, either farmed or grazed.

CALFED will evaluate proposed projects based on their ability to:

- answer remaining questions regarding conversion of agricultural lands for ecosystem restoration
- identify potential third party impacts to agriculture and opportunities to avoid or offset them
- identify additional opportunities to protect agricultural land use and promote environmentally friendly farming practices

## **Priorities for the Long-Term Implementation of the Ecosystem Restoration Program:**

### **Ecosystem Science Program**

Design and implementation of the Ecosystem Science Program is a very important component of the overall Ecosystem Restoration Program. The science program is needed to support the adaptive management component of the ERP. The science program will include an expert science panel, scientific workshops, direction for focused research efforts, data assessment, and a means by which to inject current scientific finding into the management process.

CALFED will evaluate proposed projects based on their ability to:

- Coordinate with the Comprehensive Monitoring, Assessment, and Research Program
- Establish support of the scientific community, stakeholders, and participating agencies
- Design and implement scientific workshops and seminars.

## Ecosystem Monitoring Program

The Ecosystem Restoration Program will be implemented using adaptive management. Each action will be evaluated individually and as part of an integrated whole. Effective monitoring is a major component of a science-based adaptive management program.

Substantial monitoring is presently funded in the Bay-Delta system. Resource agencies and permit holders fund approximately \$22 million each year. CALFED supports the development of a comprehensive monitoring program. The program is not yet finalized, but reasonable estimates of cost are about \$30 million a year for the ecosystem monitoring component.

CALFED will evaluate proposed projects based on their ability to:

- Integrate with the proposed Comprehensive Monitoring, Assessment, and Research Program
- Provide a mechanism to evaluate projects as adaptive experiments including conceptual models, testable hypotheses, and comprehensive monitoring
- Contribute to resolution of some of the ecological uncertainties related to the Bay-Delta ecosystem.

