CALFED
BAY-DELTA
PROGRAM

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PROBLEM/OBJECTIVE STATEMENTS

The following Primary Problem/Objective statements were developed for each of the four resource areas - ecosystem quality, water supply reliability, water quality, and system vulnerability. These narrative summaries were developed in response to comments that the detailed problem statements and objective statements for each resource area were too long and "sterile" to provide a casual reader with a feel for the problem. Furthermore, these narratives were developed to introduce the aspect of linkages between the Primary Problem/Objective areas.

PRIMARY PROBLEM/OBJECTIVE STATEMENT

ECOSYSTEM QUALITY

Problem

The Bay-Delta system no longer provides a broad diversity of habitats nor the habitat quality necessary to maintain ecological functions and support healthy populations and communities of plants and animals. Much of the public focus on ecosystem problems has centered on fisheries, especially those populations which have been designated as threatened or endangered under Federal and State laws. Declining fish populations and endangered species designations have generated major conflicts among beneficial uses of water in the Bay-Delta system. The underlying problems, however, are much broader and more far-reaching than a decline in fish. The health of the Bay-Delta ecosystem has declined in response to a loss of habitat to support various life stages of aquatic and terrestrial biota and a reduction in habitat quality due to several factors.

The steady decline in habitat quantity, quality, and diversity results from many activities both in the Delta and upstream. The earliest major damaging event was the unrestricted use of hydraulic mining in the river drainages along the eastern edge of the Central Valley, which greatly increased the amount of sediment entering the river systems. The effect of hydraulic mining was twofold. First, habitat degradation occurred in Central Valley streams as channel beds and shallow areas filled with sediment. Then the reduced capacity of the sediment-filled channels resulted in an increase in frequency and extent of periodic flooding. This accelerated the need for flood control measures to protect adjacent agricultural lands. Levee construction to protect these lands eliminated fish access to shallow overflow areas, and dredging operations to construct levees eliminated tule bed habitat along the river channels. Since the 1850s, 700,000 acres of overflow and seasonally inundated land in the Delta have been converted to agriculture or urban uses. Many of the remaining stream sections have been dredged or channelized to improve navigation, increase stream conveyance during periods of flood, and facilitate water export.

Upstream water development, depletion of natural flows and the export of water from the Delta have changed seasonal patterns of inflow, reduced annual outflow and muted the natural variability of flows into and through the Delta. Facilities constructed to support water diversions cause straying or direct losses of fish (e.g. unscreened diversions) and increased unnatural predation (e.g. Delta cross channel and Clifton Court Forebay). Entrainment and export of substantial quantities of food web organisms, eggs, larvae and young fish further exacerbate the impacts from overall habitat decline.

Habitat alteration and water diversions are not the only factors that have caused ecosystem problems. Water quality degradation caused by pollutants and increased concentrations of substances such as selenium may also have contributed to the overall decline in the health and productivity of the Delta. In addition, undesirable introduced species compete for available space and food supplies, sometimes to the detriment of native or economically important introduced species.

Objective

The primary program objective for ecosystem quality is to improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta system to support sustainable populations of diverse and valuable plant and animal species. Important habitat types include shallow water, shaded riverine aquatic, tidal slough, brackish and freshwater marsh, and riparian woodland. These habitats provide essential areas for activities that include breeding, foraging, resting, avoiding predators, and overwintering.

Linkages

The decline of species dependent on the Bay-Delta system for all or part of their life cycle now results in considerable conflict among beneficial uses of the Delta and highlights the urgent need for resolution and restoration. Key issues which affect ecosystem quality are water export, outflow, levee and channel maintenance, and other nonflow related issues. Ecosystem quality can be restored or improved through changes in export timing and the method(s) of export. Enhanced flexibility in diversion and export activities can contribute significantly to restoration of beneficial flow patterns. If additional water supplies are developed in an environmentally sensitive manner or water needs are reduced, more functional Delta outflow can be provided. Improvement in levee maintenance and stabilization can be achieved by incorporating habitat restoration on or in levees and channels into future actions. If the conflicts over levee maintenance versus habitat could be addressed, levees could be rebuilt or improved using sound levee stabilization techniques which incorporate waterside berms that provide habitat elements such as shaded riverine aquatic and riparian. Additional habitat restoration could also be accomplished during efforts to address Delta island subsidence.

PRIMARY PROBLEM/OBJECTIVE STATEMENT

WATER SUPPLY RELIABILITY

Problem

The Bay-Delta system provides the water supply for a wide range of instream, riparian, and other beneficial water uses which are authorized by appropriative, riparian, and pre-1914 water rights. While some water users depend on the Delta system for only a portion of their water supply, others have become highly or totally dependent on Delta water supplies. As water use and competition among uses has increased during the past several decades, conflicts have increased among users of Delta water. Heightened competition and conflict during certain seasons or during water-short years has magnified the impact from natural fluctuations in the hydrologic cycle.

In response to declining fish and wildlife populations, water flow and timing requirements have been established for certain fish and wildlife species with critical life stages dependent on freshwater flows. These requirements have reduced flexibility to meet the quantity and timing of water exports from the Delta. There are concerns that additional restrictions that might be needed to protect species could increase the uncertainty of Delta water supplies. This basic disparity between water needs and water availability has created economic uncertainty in the water service areas and increased potential conflict over supplies.

A related concern is the vulnerability of the Delta water transport system of levees and channels to catastrophic failure due to earthquakes or overtopping during floods. This system is also vulnerable to general failure as a result of decreasing levee stability. Such failures in the system could result in interruptions in water use in the Delta or water transport across the Delta for periods which could vary in length from days to several months.

Objective

The primary objective for water supply reliability is to reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system. This can be accomplished by reducing the conflict among beneficial water uses, improving the ability to transport water through the Bay-Delta system, and reducing the uncertainty of supplies from the Bay-Delta system. The mismatch between supplies and projected beneficial uses needs to be addressed for both the short and long-term planning horizons. The mismatch can be addressed from both the supply and demand sides. Flexibility in the transport of water across the Delta needs to be enhanced so that all of the water management tools, including demand management, water transfer, and supply augmentation, are available to the water service agencies to match quantity and timing of supply with beneficial use patterns. Steps also need to be taken to more effectively manage the risk associated with catastrophic failure of the Delta water transport system.

Linkages

A critical issue which affects water supply reliability is the impact of water supply diversions on the ecosystem, especially endangered species. Therefore, water supply reliability can be improved by actions which recover and protect endangered species. By reducing the conflict between the ecosystem and water diversions, the opportunities to transport water through the Delta can be increased. This reduction in conflict will create flexibility to more effectively use water supplies through water management programs such as water transfers (e.g. drought year transfers) and augmentation of water supply. Supply augmentation actions may consist of conjunctive use, coordinated operation of existing reservoirs, developing surface and groundwater storage programs, developing storage capabilities within the Delta, development of groundwater resources, and water reclamation.

Water management programs that alter the timing of Delta inflow can produce synergistic benefits, providing Delta inflow when it is beneficial to Delta aquatic habitat and improving water quality in Delta channels . Similarly, water management programs that provide opportunities to alter timing of Delta outflow can benefit Suisun Bay and San Francisco Bay while at the same time providing opportunities for additional water supply transport across the Delta. This can reduce conflict among beneficial uses and provide benefits for the ecosystem and for water supply reliability. In order to effectively reduce the conflict between ecosystem water needs and other beneficial uses of water dependent on the Bay-Delta system, water management programs may need to include elements to reduce or manage demand, improve Delta water transport capabilities, and reduce the risk to the transport system from catastrophic failure.

PRIMARY PROBLEM/OBJECTIVE STATEMENT

WATER QUALITY

Problem

The Delta is a source of drinking water for millions of Californians and is critical to the state's agricultural sector. In addition, good water quality is required to maintain the high quality habitat needed in the Bay-Delta system to support a diversity of fish and wildlife populations. Yet, despite improvements in Bay-Delta water quality, the issue remains a primary concern in the Delta.

Pollutants enter the Delta through a variety of sources including sewage treatment plants, industrial facilities, forests, farms and farm fields, mines, residential landscaping, urban streets, and natural sources. They find their way to even the Delta's most remote areas where they interact with water, sediment, plants, and animals. The pollutants, pathogens, natural organics, and salts in Delta waters impact to varying degrees existing fish and wildlife, as well as human and agricultural use of these waters. The salts, entering the Delta through the Bay from the ocean and from agricultural returns upstream, decrease the utility of Delta waters for many purposes including agriculture, drinking water and the ecosystem. The level of natural organics in the water (mainly resulting from the natural process of plant decay on many of the Delta peat soil islands) is of concern because of the way natural organics react with other chemicals during the treatment process necessary to produce safe drinking water. During this treatment, certain by-products are created which may produce potentially adverse human health effects. Pathogens, which include viruses, Giardia and Cryptosporidium, enter the Delta through a variety of sources and pose both human health and treatment-related concerns.

Objective

The primary objective for water quality in the Bay-Delta system is to provide good quality water for all beneficial uses. In this context, the term "beneficial uses" covers a wide range of water uses and includes fish and wildlife use, municipal and industrial use, agricultural use, recreational use, and other uses. In most cases, the specific water quality objectives for the various beneficial uses relate to reducing constituent levels. In other cases, the specific objective is to better manage water quality through a variety of measures including minimizing the cost of treating the source waters.

Linkages

The quantity and timing of the water flowing into and out of the Delta directly affects water quality in the Bay-Delta system. Quantity and timing are functions of the natural runoff patterns, changes in land and water use, operations of upstream water projects, diversions (upstream and in-Delta), and exports from the Delta. Thus, any modification to system

operations to improve ecosystem quality or to reduce the conflict between ecosystem and water supply, will directly affect water quality for specific beneficial uses, either positively or negatively. Similarly, modifications to system operations to improve water quality will directly affect water supply reliability. This linkage is especially apparent in some reaches of the San Joaquin River within the Delta. While managing and improving water quality is a primary objective of the CALFED Bay-Delta Program, the achievement of the key specific water quality objectives is closely linked to objectives for ecosystem quality and water supply reliability.

PRIMARY PROBLEM/OBJECTIVE STATEMENT

SYSTEM VULNERABILITY

Problem

Levees were first constructed in the Sacramento-San Joaquin Delta during the late 1800s, when settlers began to turn tidal marshes into agricultural land. Over time, both natural settling of the levees and shallow subsidence of Delta island soils (oxidation which lowers the level of the land over time) resulted in a need to increase levee heights to maintain protection. There is a growing concern that this increased height, coupled with poor levee construction and inadequate maintenance, makes Delta levees vulnerable to failure, especially during earthquakes or floods. Failure of Delta levees can result in flooding of Delta island farmland and wildlife habitat. If a flooded island is not repaired and drained, the resulting large body of open water can expose adjacent islands to increased wave action and possible levee erosion. Levee failure on specific islands can have impacts on water supply distribution systems such as the Mokelumne Aqueduct. Similarly, levee failure on key Delta islands can draw salty water up into the Delta, as water from downstream rushed to fill the breached island. This would be of particular concern in a low water year when less freshwater would be available to repel the incoming salt water. Such a failure could result in a long interruption of water supply for in-Delta and export use by both urban and agricultural users, until the salt water could be flushed from the Delta. Long-term flooding of key Delta islands can also have an effect on water quality by changing the rate and area of the mixing zone.

Local reclamation districts are concerned with the cost of maintaining and improving the levee and channel system. The complex array of agencies with planning, regulatory, and/or permitting authorities over levees makes rehabilitation and maintenance efforts difficult. Regulatory measures which protect endangered species or critical habitat sometimes conflict with and prolong levee rehabilitation and maintenance work, which can further increase the vulnerability of the system.

Objective

The primary program objective for addressing Bay-Delta system vulnerability is to reduce the risk to land use and associated economic activities, water supply, infrastructure, and the ecosystem from catastrophic breaching of Delta levees. The vulnerability of the levee system to both general failure and sudden catastrophic failure can be reduced by implementing an integrated and comprehensive program for Delta levees and channels. This plan would need to streamline and consolidate the planning, regulatory, and permitting processes which affect the system, and provide a reliable funding source for system maintenance and rehabilitation.

Linkages

An important aspect of reducing risk and making the system less vulnerable to failure will be to reduce the conflict between protection of wildlife habitat that occurs on levees, and maintenance of these levees to prevent failure. Riparian woodland, shaded riverine aquatic, and shallow water habitats are very important for fish and wildlife in the Delta, including threatened and endangered species. In many cases, objectives of reducing risk of catastrophic failure and protection of ecosystem quality can be achieved by incorporating habitat restoration and protection elements in levee system stabilization actions. Conversely, projects to restore or enhance habitat can achieve multiple objectives if they are planned with levee vulnerability in mind. A second critical linkage can occur between efforts to reduce or reverse subsidence and efforts to restore habitat. Both the Delta ecosystem (including the aquatic habitat and the terrestrial habitat found on the levees and inside the islands) and system stability can benefit from reducing land surface subsidence adjacent to the levees. This achievement of multiple objectives can occur where levee stabilization is proposed and where habitat enhancement (riverine and riparian) is proposed. For example, one method to reduce subsidence, the creation of shallow wetlands adjacent to the landside toe of the levee, also serves to enhance habitat.