

March 22, 1995

Title: Divert outmigrating eggs, larvae, and anadromous fish into the Sacramento Deepwater Ship Channel away from the central Delta and the influence of the water export facilities.

Category: (To be developed)

Resource Area: Aquatic Resources AR-A-2

Related Options: AR-A-4, AR-A-5, AR-A-6

Resource Issue:

Outmigrating eggs, larvae, and fish are often diverted by water project diversion induced hydrodynamics from their normal migration routes and nursery areas by central Delta flow patterns. The transport of these organisms into the less productive areas of the central Delta result in increased mortality and eventual reduction of fishery populations due to reasons described below. These organisms diverted into the central Delta are likely to be entrained within water export facilities and agricultural diversions. In addition, they encounter increased rates of mortality through predation and increased water temperatures when diverted into the central Delta. Transporting these organisms through the Deep Water Ship Channel avoids the potential transport through the Delta Cross Channel and Georgiana Slough into the central Delta. There are several factors that may influence the effectiveness of this option. One of these factors is the potential accumulation of predators within the channel and near the fish diversion facility. In addition, water quality problems affecting aquatic, as well as wildlife, resources could occur in the Deepwater channel if ships discharge brackish ballast water into the narrow channel.

Discussion:

The implementation of this action option would divert outmigrating eggs, larvae, and fish into the Sacramento Deepwater Ship Channel and away from possible entrainment into the Central Delta. This diversion into the ship channel would move these organisms toward the Suisun Bay and into the X2 zone. The X2 zone is defined as the region of the Estuary where the salinity gradient is at 2 parts per thousand and it is the area where the greatest concentration of the lower trophic levels (zoo- and phytoplankton) occurs. In addition it is considered to be the primary nursery area for estuarine species in the Sacramento-San Joaquin Delta. Diversion of organisms into the Deepwater Channel is considered to be proportional to the amount of flow diverted into the channel. This is assumed because organisms are believed to be dispersed through out the horizontal column of water. However, if a diversion facility is constructed and operated then organism diversion would not be proportional to flow. The goal would be to divert fish into the deep water channel away from the water export facilities' zone of influence in the southern Delta. Water quality problems could occur in the Delta when additional waters are diverted into Deepwater channel off of the Sacramento River for this option.

Objectives addressed:

Biological Resources General Objective, and Specific Objectives 1, 2 and 3; Water Quality General Objective, Specific Objective 2; Water Supply and Export Operations General Objective, Specific Objective 1.

The water quality and conveyance experts would need to review this option to assure that diverting through the Sacramento Deepwater Channel will not compromise water quality or supply. Biologist would need to examine the effects of diverting fish into the channel and into the Suisun Bay.

Assumptions:

- Fish, eggs, and larvae can be effectively diverted into the Sacramento Deepwater Channel.
- Diversion of organisms is proportional to flow.
- Remaining flow would be sufficient to transport remaining organisms down the Sacramento River.
- Diversion of out migrant fish, larvae, and eggs would not interfere with current Deepwater Channel operations.

Key Feasibility Factors:

- Confirm that the head of the Deepwater Channel can be modified to divert organisms and still accommodate ship traffic.
- Confirm that predator levels do not increase in channel or at diversion facility.
- Determine what level of flow would be necessary to transport organisms down the Deepwater Channel and into Suisun Bay.
- Determine if salt intrusion would increase due to decreased Sacramento River flow.
- Confirm that reduced Sacramento River flows would not impact water supply facilities in the Delta.

Implementation Effects:

Most Likely Benefit:

- Increased survival and increases in populations of anadromous fish species.

Other Possible Benefits:

- Reduced entrainment of fish at the water diversion facilities in the southern Delta

Most Likely Negative Impacts:

- Reduced flow in the lower Sacramento River.
- Increased diversions by the State and federal water export facilities.
- Possible salt intrusion in the south and western Delta due to reduced flow of the Sacramento River.

Other Possible Negative Impacts:

- Potential increase in fishing pressure on anadromous fish populations as numbers increase.

Possible Regulatory and Institutional Constraints:

CEQA, NEPA, ESA, CESA, Corps' 404 permit and Section 10 Permit,
Sacramento County Regulations

References and Published Materials:

USCE, Jan. 1994, Northern California Streams Sacramento River Fish
Migration, Draft Reconnaissance Report

DFG memo by Dan Odenweller dealing with different measures of diverting fish away
from the central Delta.