Summary and Recommendations for the Department of Fish and Game's Testimony on the Tributaries to the Sacramento-San Joaquin Estuary

Presented to the State Water Resources Control Board
Interim Water rights Actions Phase
Bay-Delta Estuary Proceedings

California Department of Fish and Game
Environmental Services Division
1416 Ninth Street
Sacramento, California 95814

WRINT-DFG Exhibit No. 29

INTRODUCTION

The Department of Fish and Game (DFG) would like to present suggestions to the State Water Resources Control Board (SWRCB) on a method that could be used to allocate the Delta outflows, identified in previous DFG testimony, that will complement upstream fisheries needs and ensure maximum benefits for anadromous fisheries from any Delta improvement. It is also our suggestion that biologically based allocations of Delta outflow responsibilities will avoid or minimize impacts upstream, both to fish and to water users.

DFG would also like to propose interim actions and long-term goals in the tributaries to the Bay-Delta Estuary that could benefit the anadromous fisheries which use both the tributaries and the Delta. These proposals are included in the following exhibits:

WRINT-DFG EXHIBIT 14
WRINT-DFG Exhibit 15
WRINT-DFG EXHIBIT 16
WRINT-DFG EXHIBIT 17
WRINT-DFG EXHIBIT 18
WRINT-DFG EXHIBIT 23
WRINT-DFG EXHIBIT 24
WRINT-DFG EXHIBIT 25

DFG would like to withdraw WRINT-DFG Exhibits 19 through 22 which recommended minimum flows for the Mokelumne and Yuba rivers.

The SWRCB has held hearings on the Yuba River and a proposed order should be out shortly which will consider the issue of minimum flows on the Yuba River.

The SWRCB adopted a Study Plan on August 7, 1991 to review the water rights on the lower Mokelumne River. This Study Plan found that the basic issues on the Mokelumne River included "How do stream flow, water quality, Delta operations, and non-flow related variables influence fall-run chinook salmon stocks and other fishery resources on the Mokelumne River." The SWRCB has tentatively scheduled a hearing to consider the information in the fall of 1992. While the outcome of that hearing will not be available by the time the SWRCB issues a proposed order for the interim Bay-Delta proceedings, the information will be available to be used as part of any long-term Bay-Delta solution.

Action by the SWRCB in the interim Bay-Delta proceedings could include a mechanism to integrate the results of the

hearings on the Yuba and Mokelumne as well as any other hearings on instream flows in the tributaries into the interim and long-term Bay-Delta decisions.

The Bay-Delta Estuary and the Central Valley rivers which feed into it function as an ecosystem and suffer from a variety of ailments which need attention. Water to meet Delta outflow and export needs obviously originates from the tributaries and anadromous fishes have evolved and adapted to this hydrologic linkage. This creates both problems and opportunities. Problems arise when operations to meet downstream water demands reduce carryover storage in reservoirs or cause flow fluctuations in the tributaries. These problems are accentuated due to the fact that releases for Delta water quality, under balanced conditions, are made from only three reservoirs. Opportunities arise because water released to meet downstream needs from all the tributaries can also provide benefits to the salmon, steelhead, and other anadromous fishes migrating upstream from the Delta, spawning and rearing in the tributaries, and migrating back through the Delta to the ocean.

We have highlighted suggestions for carryover storage, flow stability criteria, and other measures for action as part of this interim proceeding. Estimates of minimum flow needs are presented to the extent they support carryover storage needs and for use by the SWRCB as they consider the overall balancing of different beneficial uses in the tributaries and in the Delta.

But each part of the ecosystem must be protected in order to achieve the goal of halting the declines and beginning the restoration of anadromous fisheries that rely both on the tributaries and the Delta. We encourage the SWRCB to adopt procedures and measures in the current Bay-Delta proceedings which integrate instream flow needs in the tributaries that are adopted in future proceedings. We can only restore the balance if all the different parts of the system are integrated.

SUGGESTIONS ON METHODS THAT COULD BE USED TO ALLOCATE DELTA OUTFLOW REQUIREMENTS

DFG, as described in WRINT-DFG-Exhibit 8, has provided a range of alternatives for protection of public trust uses in the Bay-Delta Estuary. That exhibit concluded that many fish species dependant on the Bay-Delta Estuary for food, nursery habitat, and as a migration corridor were in decline. Most native estuarine and anadromous fishes living within the brackish and freshwater portions of the Estuary exhibit a general pattern of increasing abundance in relation to magnitude of Delta outflow during the winter and spring and most estuarine and anadromous fish were more abundant in wet than in dry years. The declines are also due to direct and indirect losses at the State Water Project (SWP) and Central Valley Project (CVP) pumping facilities as well

as other factors.

While the impact of any one water development project on Delta inflow and outflow may be relatively small, the major non-State or Federal projects together have a storage capacity which represents roughly 28 percent of the storage in the Central Valley as shown in Table 1. The impacts of a water storage facility on Delta outflow are more complex than this simple comparison of storage capacity, and can vary with factors such as hydropower operations, flood control storage operations, and frequency of spill, but this comparison provides a general indication of the magnitude of the relative impact.

In addition to the SWP and CVP, other water development projects on the tributaries to the Delta have contributed to decreased Delta outflow and associated effects on fisheries.

Table 1. Storage in Major Reservoirs on Rivers that Support Substantial Salmon Runs in the Central Valley.

Reservoir	Storage (acre-feet)
Shasta	4,552,000
Keswick	23,800
Oroville	3,540,000
New Bullards Bar	969,600
Folsom	1,010,000
Camanche/Pardee	641,500
New Don Pedro	2,030,000
New Melones	2,400,000
New McClure	1,000,000
Millerton	520,000
Total	16,686,900

Storage Operated by US Bureau of Reclamation	51%
Storage Operated by Department of Water Resources	21%
Storage Operated by Others	28%

In addition to the effects of these water development projects on Delta inflow and outflow, the major storage reservoirs upstream of the salmon spawning and rearing areas make minimum flow releases to provide habitat for these uses. Many of these minimum flow releases are not adequate to provide the habitat needed to optimize or in some cases to maintain anadromous fisheries habitat downstream and this limits the potential benefits of any change in Delta operation or outflow.

To offset some of the effects of other water development projects on Delta outflow and to provide conjunctive benefits to salmon and steelhead habitat in the tributaries, we suggest the SWRCB consider requiring flow contributions from the tributaries

to provide a fair share portion of Delta outflow. One way this contribution could be allocated is on the basis of unimpaired runoff. You could use the period of record from 1906 to the present, the 50 year averages, or the estimated annual unimpaired runoff published in Department of Water Resource's (DWR's) Bulletin 120. Water year types could be set annually or more frequently if needed.

For an example of how this concept could work, we used the 50 year average unimpaired runoff published in Bulletin 120-92. Table 2 shows the percent contribution for each tributary. This does not include the Cosumnes River because there is no major storage facility and does not include the tributaries on the west side of the Sacramento Valley because flow contributions from these reservoirs would have little conjunctive benefit for anadromous fisheries. The San Joaquin River at Millerton has been included because its historical contribution was quite large and there is a large water storage facility. This contribution to Delta outflow could be provided from the San Joaquin itself or, if this was infeasible, through alternative means such as water trades or transfers.

Table 2. Percent Contribution to Unimpaired Runoff by River.

Water	50 Year Estimated Unimpaired Runoff (MAF)	Percent Contribution
Sacramento River at Bend Bridge	8.664	34.75
Feather River at Oroville	4.617	18.52
Yuba River at Smartville	2.390	9.59
American River at Folsom	2.736	10.98
Mokelumne River at Pardee	0.748	3.00
Stanislaus River at New Melones	1.150	4.61
Tuolumne River at Don Pedro	1.882	7.55
Merced River at Exchequer	0.966	3.88
San Joaquin River at Millerton	1.776	7.12
TOTAL	24.929	

In Table 3, DFG used these percentages and the critical dry year flows presented in Alternative A of WRINT-DFG Exhibit 8, to determine what amount of flow would be needed from each tributary to provide Delta outflow. These flow amounts are not the total amount needed to protect instream habitat in the tributaries but are the amount to be dedicated to Delta outflow. In this simple example, these allocations could be measured at the mouth of each tributary for non-CVP/SWP rivers. This example does not take into account the downstream demands such as riparian diversions and diversions at the State and Federal pumps or other accretions or depletions. Nor does it deal with the priorities of water rights within or between these basins. It merely serves as an example of a method that could be used to allocate additional

TABLE 3. Contribution by Tributary to Alternative A Delta Outflow in a Critical Dry Year Allocated Using Distribution of Unimpaired Runoff (cubic feet per second).

CRITICAL DRY YEAR

	Sacramento	Feather	Yuba	American	Mokelumne	Stanislaus	Tuolumne	Merced	San Joaquin	Delta Outflow
February	2780	1482	767	878	240	369	604	310	570	8000
March	2502	1333	690	790	216	332	544	279	513	7200
April	2259	1204	623	713	195	300	491	252	463	6500
May	1981	1056	546	626	171	263	430	221	406	5700
June	1807	963	499	571	156	240	393	202	370	5200
July	1390	741	383	439	120	185	302	155	285	4000
August-December	1286	685	355	406	111	171	279	143	264	3700

Delta outflow needs that makes sense biologically. This method could be further refined by shifting flows among the various tributaries from months when it provides less fisheries benefits to months when it provides greater benefits. For example in rivers where there is little need for summer flows, contributions to Delta outflow could be shifted to other months when they would provide greater benefits in the tributary.

CURRENT STATUS AND TRENDS

In February 1992, DFG provided the Fish and Game Commission with a Status Report on California Salmon. That report found that:

> Based on present water supply forecasts for the State, it is clear that California is entering an unprecedented sixth year of low water supply. Our traditional indices of salmon abundance provide little expectation that the sport and commercial fisheries or spawner escapements will show any increase in the coming year. In fact, it is highly probable that further declines in the numbers of some races and stocks and further restrictions on the commercial and sport harvest of salmon may occur. Of particular concern are the winter-run chinook salmon of the upper Sacramento River, the spring-run chinook salmon of the upper Sacramento and the Klamath basins, the San Joaquin fall-run chinook salmon, and the coastal populations of coho salmon.

These population declines may not stabilize or have opportunity to recover unless significant changes and improvements are made in water supply and habitat conditions for spawning, rearing, and emigration. Specific information on the status of these Central Valley runs of particular concern are contained in WRINT-DFG Exhibit 14 and 25.

INTERIM MEASURES

Sacramento River

On an interim basis, DFG believes that the recommendations in WRINT-DFG Exhibit 14 related to flow stability criteria, balancing of instream flows with minimum carryover storage in Shasta Reservoir, and allocation of water for experimental releases for outmigration when Shasta Reservoir storage is above certain levels would provide protection and some restoration of the anadromous fisheries of the upper Sacramento River. The interim recommendations for balancing of carryover storage with instream flows will be revised considerably when a temperature control structure is constructed on Shasta Dam.

Feather River

During the drought period, Oroville Reservoir has been drawn down to low levels as water has been released to meet downstream needs. This has caused temperature concerns in the Feather River and at the Feather River Hatchery. In recognition of these problems, the SWRCB in its order approving the 1990 Oroville Wyandotte Irrigation District transfer specifically included conditions to prevent additional temperature impacts from the transfer. Also, the SWRCB Order 90-8 approving the transfer from Yuba County Water Agency (YCWA) to DWR included a temperature criteria of a daily average of 56 degrees Fahrenheit during October, November, and December for the Feather River to prevent impacts to spawning salmon.

To prevent temperature impacts in the future, DFG suggests that a minimum pool of 1.5 million acre feet (MAF) be required to ensure that any actions including Delta water quality standards do not adversely impact fisheries habitat in the Feather River. Another measure to avoid temperature impacts is to eliminate pumpback operations when Oroville Reservoir drops below 1.7 MAF. These suggested minimum pool levels will be revised if the DWR develops the ability to operate the low level river outlet on Oroville Dam.

American River

On an interim basis, DFG believes that the recommendations in WRINT-DFG Exhibit 15 related to flow fluctuations and minimum carryover storage in Folsom Reservoir would provide for some protection and restoration of the anadromous fisheries of the lower American River. DFG has evaluated whether the minimum carryover storage recommendation on October 1 would impact either the existing or proposed flood control operations and we believe that this recommendation would not affect either flood control operation scenario.

San Joaquin System

On an interim basis, DFG believes that the interim measures A,B,C, and D in the Executive Summary of WRINT-DFG Exhibit 25 would provide for some protection and restoration of fall-run chinook in the San Joaquin drainage. We recognize these measures for habitat restoration differ substantially from those proposed for the Sacramento drainage. This is necessitated by the fact that the majority of developed water on the San Joaquin is diverted at or above the lowest dams. Hence, we have suggested very conservative "freshet" flows that minimize water allocations as an interim and experimental approach in the San Joaquin system.