MEMORANDUM

Diversion Effects on Fish
Appendix A—Salmon

TO: Ron Ott

FROM: Joe Patten

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The subject interim report apparently does not draw any clear conclusions. So many vague qualifications on conditions are attached to the "professional judgments" that any conclusions drawn from the material would be suspect. Evaluating only Delta impacts without considering upstream and downstream influences is not very revealing, and apparently the authors appear to admit that. More questions are raised than answers given.

I attempted to draw my own conclusions from the numbers in Table 2. Every set of numbers except one (Flow below Hood) shows worse effects with "maximum storage" than any of the other conditions or alternatives. I can only conclude that the group doesn't understand how to use storage, or the operations models were faulty. And the numbers for Alternatives 2 and 3 at (-)28 for Flow below Hood are so large that they appear to have a disproportionate influence on the total numbers. I'm interested in the basis for that influence.

Apparently, there is a lack of good recent scientific data. My observation from over 40 years in major water resources planning throughout the west is that regulators relying on police power for the most part were never good resource (project) planners. They are always in the position of reviewing someone else's project proposal with the objective of establishing conditions to protect a specific resource. Your people are now project planners and need to be positive thinkers to consolidate or define the problems, establish objectives, and then seek out solutions.

Reflecting on some of my experience it is apparent to me that most of the regulators do not fully explore the cause and effect of significant positive hydrologic or other events and their influences on fisheries. Some of the events that I am familiar with cause me to ask why? What conditions prevailed to cause a certain effect, and how can we duplicate those conditions? For example, the winter run was claimed by Dan Slater, who worked on the Sacramento River for USFWS during the 1950s and 60s, to have been very small before Shasta because of limited habitat. Yet, the population of this run exploded to over 120,000 fish as counted at Red Bluff Diversion Dam (RBDD) in 1969. My view is that this occurred because there was plenty of cold water, deep holding pools, and ample spawning gravel below Keswick Dam starting in 1945. These were perfect conditions for their life cycle, enhancing their natural habitat so they produced abundantly. Incidentally, the increases in production occurred when there were no screens on any of the Sacramento River diversions. This was a phenomenal event from which much should have been learned. Unfortunately, more attention was given to the reduction in the run following 1969, resulting from the fish passage problems at RBDD, the warm water from Shasta Dam in

1976-77, and the progressive movement of gravel (and therefore spawning) downstream. Had these problems been addressed by examining the cause and effect of Shasta operations during the 1950s and 60s (the period of increase), we might have been able to mitigate them much earlier. And now that we are charged with doubling the Central Valley salmon runs under CVPIA, the positive effects on the winter run, if fully understood, could help meet that mandate. With temperature control in place and a gravel replenishment program ongoing, the habitat is available to support large winter or spring runs in the upper reaches of the Sacramento River.

Another series of events that has intrigued me is the fry flushings of the 1982 year class of the fall run of salmon in the Sacramento River. The flood of April 1983 flushed the fall run fry and the return in 1985 was significantly increased. The same thing occurred in the spring of 1986, and the harvest of record was taken in the ocean in 1988. The same year class got swept out again in 1995, and the return last year was the highest in 40 years. I'm not knowledgeable of Delta influences during these years, but the flushing effects of the floods on the upper river are obvious. If we identify the cause and effects of these events, we could then address operational procedures to approach them in years without natural flooding events. This has been done with some degree of success to flush the Coleman Hatchery releases in the spring by increasing Shasta releases.

All of the above discussion relates to some degree to storage and its operations. And westside storage, if implemented, offers the greatest opportunities for flexibility and options for fishery enhancements. There is considerable optimism expressed for the raising of Shasta Dam. However, any new water from Shasta flows down the river, which is operated as a canal. On the other hand, westside storage can accommodate exchanges with Shasta and the river diverters, allowing greater flexibility for Shasta releases to better serve fish. In addition, westside storage is needed to relieve the overload on Shasta.

Summary

It is apparent that a holistic view of the entire Delta watershed and historical conditions that have proven beneficial to specific year classes is needed. These perspectives will enable the CALFED agencies to better evaluate opportunities for fisheries enhancements in association with the ongoing fisheries restoration efforts. Further, specific alternatives for supplementing existing storage must be included in the equation to thoroughly evaluate these opportunities. Evaluations reflecting only a range of storage volumes will not provide sufficient information to truly test the system under operational scenarios that will be beneficial to the current fisheries restoration efforts. Excluding both upstream and downstream influences and the impacts of specific storage alternatives reduces the credibility of the current analyses and the validity of the system operational modeling.