

**Review of Impacts of Delta Water Quality and Delta Water Exports
on the Decline of Chinook Salmon in the SJR Watershed***

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On August 15, 2008 NOAA's National Marine Fisheries Service (NMFS) held a *Salmon Decline Working Group* meeting in Sacramento to discuss the decline of salmon populations in Central Valley waters. The following comments, submitted to NOAA NMFS in response to its request, highlight and augment the authors' previous discussions of Delta water quality issues and the impacts of the US Bureau of Reclamation (USBR) and California Department of Water Resources (DWR) Delta export pumping of Delta water on salmon homing in the San Joaquin River (SJR) watershed.

G. Fred Lee has long been interested in the impacts of water quality on the homing of fish. In the early 1960s, while serving as Professor of Water Chemistry at the University of Wisconsin-Madison, he supervised the MS thesis work of a graduate student on the ability of Coho salmon to recognize Lake Michigan homestream tributary waters by monitoring fish brain waves associated with olfactory exposure (Cooper et al., 1974).

The authors have been involved in the evaluation of Delta water quality issues since 1989; a summary of their work in this area is available on their website [www.gfredlee.com] at <http://www.gfredlee.com/Delta-SJR-exp.pdf>. Their writings on their SJR and Delta-related work are available at <http://www.gfredlee.com/psjriv2.htm>, and include the synthesis report (Lee and Jones-Lee, 2003a, 2004a) covering the findings of the \$2-million CALFED project for which they served as coordinating PIs. That project was undertaken to investigate the causes and water quality impacts of the low-dissolved oxygen (DO) conditions in the San Joaquin River Deep Water Ship Channel (DWSC) near the Port of Stockton. A primary concern was the potential for the low-DO conditions in the SJR DWSC to block the homing of fall-run Chinook salmon through the DWSC. As their synthesis report noted, there remains a need for studies to determine if the low-DO conditions as they exist actually block passage of Chinook salmon through the SJR DWSC. Also of concern was the potential for the elevated temperature condition of the DWSC, or a combination of low-DO and elevated temperature, to impede passage of salmon through the DWSC. It is possible that the slowing of the fall-run Chinook salmon exhibited in their passage through the seven-mile section of SJR DWSC between Turner Cut and the Port of Stockton that is caused by these conditions is contributing to the impairment of their reproduction.

* Reference as: Lee, G. F., and Jones-Lee, A, "Review of Impacts of Delta Water Quality and Delta Water Exports on the Decline of Chinook Salmon in the SJR Watershed," Comments submitted to NMFS Southwest Fisheries Science Center, NOAA, Santa Cruz, CA, by G. Fred Lee & Associates, El Macero, CA, August (2008). [www.gfredlee.com/SJR-Delta/Salmon-NOAAcom.pdf]

The authors have also investigated how the state and federal export projects in the South Delta alter and control the flow of the SJR water in the South and Central Delta. Several years ago they discussed these issues and common misconceptions about them in a report submitted for publication in the IEP Newsletter (Lee and Jones-Lee, 2003b). Since the DWR editor of the IEP Newsletter did not acknowledge receipt of that submission, either of the two times it was submitted, it could be surmised that DWR did not want it published, perhaps because it showed that the DWR Delta state export project at Banks was impacting the homestream water signal for salmon in the SJR watershed. What is clear is that when the state and federal export projects in the South Delta are operating as they have been for many years, they draw all SJR water, along with any associated homestream water homing signal, that enters the Delta to the Tracy and Banks export pumps following the end of VAMP during the summer and fall and into the winter.

Several issues of the authors' "*Stormwater Runoff Water Quality Newsletter*" [<http://gfredlee.com/newsindex.htm>] address aspects of their work on Delta water quality issues. Notable is Volume 10 Numbers 10 & 11, October 18, 2007, which deal with water resource and quality crisis issues in the Sacramento San Joaquin Delta. [<http://www.gfredlee.com/Newsletter/swnewsV10N10-11.pdf>].

During the August 15, 2008 NMFS *Salmon Decline Working Group* meeting questions were asked about the potential role of toxics in the salmon decline. As Lee indicated at the meeting, from his decades of experience evaluating the impacts of chemicals on aquatic life and his involvement in the Delta and its tributaries over the past 15 years (see Lee and Jones-Lee, 2004b, 2007), while at some times and at some locations there is some toxicity to some forms of fish larvae and zooplankton in the Delta and Delta tributary waters due to pesticide discharges from agricultural and urban areas, it does not appear that that toxicity is responsible for the recent salmon decline. If toxics are playing a role in the recent decline, it is subtle one. This does not mean that current pesticide and other discharges are not having adverse impacts on fish in the Central Valley waterbodies; it only means that there seems to be little foundation upon which to causally relate the recent salmon decline to toxics.

Lee has also followed the current work on the pelagic organism decline (POD) as well as the current CVRWQCB Ag Waiver water quality monitoring for toxicity and chemical concentrations. Several issues of the *Stormwater Runoff Water Quality Newsletter* [<http://www.gfredlee.com/newsindex.htm>] address his work on pesticides in California urban and agricultural waters.

References

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