

## Comments on Bay Delta Conservation Plan (BDCP) Draft EIR/EIS

### Chapter 8 – Water Quality

### Chapter 25 – Public Health

G. Fred Lee, PhD, PE, BCEE, F.ASCE and Anne Jones-Lee, PhD

G. Fred Lee & Associates

El Macero, California

July 25, 2014

The following comments are offered in response to the request for public comment on the Bay Delta Conservation Plan (BDCP) Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) (<http://baydeltaconservationplan.com/PublicReview.aspx>). According to published information ([http://baydeltaconservationplan.com/Libraries/Dynamic\\_Document\\_Library/Highlights\\_of\\_the\\_Draft\\_EIR-EIS\\_12-9-13.sflb.ashx](http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Highlights_of_the_Draft_EIR-EIS_12-9-13.sflb.ashx)),

*“The proposed Bay Delta Conservation Plan (BDCP) is a comprehensive conservation strategy that intends to address the critical issues in the Delta using an ecosystem-based approach. The Plan would help to restore fish and wildlife species in the Delta and to improve reliability of water supplies, while minimizing impacts on Delta communities and farms.”*

*“The Draft EIR/EIS is intended to analyze and disclose the potential impacts on the human environment from the proposed action and alternatives.”*

These comments address Chapter 8 of the draft EIR/EIS, which is devoted to Delta Water Quality as impacted by the preferred alternative plan described thus: ([http://baydeltaconservationplan.com/Libraries/Dynamic\\_Document\\_Library/Draft\\_BDCP\\_Highlights\\_12-9-13.sflb.ashx](http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Draft_BDCP_Highlights_12-9-13.sflb.ashx)):

*“The proposed BDCP project includes three new intakes along the Sacramento River in the north Delta and twin underground main tunnels through the Delta, approximately 30 miles long, to carry water under the Delta to the CVP [Central Valley Project] and SWP [State Water Project] pumping plants. A forebay would be needed near the intakes to collect water diverted from the river, then gravity flow would move water supplies through the tunnels.”*

*“The twin tunnels would be lined with concrete segments and capable of moving a maximum of 9,000 cubic feet per second (cfs). The gravity-flow system requires two 40-foot-diameter tunnels to convey the needed flows and overcome friction losses to keep water moving through the system.”*

These comments also address additional aspects of public health impacts of the proposed project as included in Chapter 25 of the draft EIR/EIS, which is described thus (Chapter 25 page 1):

*“This chapter focuses on issues related to human health and safety that could potentially be affected by implementation of the BDCP alternatives, particularly with respect to water quality, the potential to cause or worsen water borne illness, the potential to create habitat for vectors that may carry diseases; and to address potential health related concerns from additional electric transmission lines needed under most of the alternatives.”*

Submitted as part of comments provided by California Sportfishing Protection Alliance, Stockton, CA to Ryan Wulff, NOAA National Marine Fisheries Service, Sacramento, CA, July 28 (2014).

## **Overall Assessment**

Overall, the draft BDCP EIR/EIS and approaches used in its development are inadequate in scope and reliability for evaluating the potential impacts of diverting substantial amounts of Sacramento River water around or through the Delta on chemical constituents and water quality in Delta channels. The draft EIR/EIS basically used model output of expected changes in the concentrations of a few water quality parameters that have not been found to exceed a water quality objective at a few selected locations in the Delta as was done for this draft EIR/EIS. The approach used does not adequately or reliably consider the range of water quality impacts caused by the wide variety of potential pollutants present in the various Delta channels, that can be expected to result from the removal of large amounts of high-quality Sacramento River water from the Delta by this project.

As discussed herein the existing database on chemical contaminants contributed to the Delta, the impacts of sources of flow and changes in those sources on contaminant concentration, distribution, and impact within the Delta, and Delta channel water quality overall is too limited to make a sufficiently reliable assessment of the impacts of a project as extensive, expensive, and far-reaching as that proposed. Further, the level of uncertainty inherent in the existing modeling of Delta channel flows, and the Sacramento River component of those flows, renders it insufficiently reliable to adequately estimate the change in channel flow and character that will be expected to result from the massive diversion of Sacramento River flow around or through the Delta as proposed, much less the influence on those flow alterations on the concentrations, distribution, and impacts of chemical contaminants in the Delta.

As discussed in these comments there are a number of issues that should have been, but were not adequately, considered in assessing the water quality impacts of the existing Sacramento River flow into the Delta as well as the impacts of significantly reducing that flow. An area of the Delta of importance and with which Dr. Lee is particularly familiar is the Central Delta where the Sacramento River mixes with the San Joaquin River below Columbia Cut. As found in his studies of that area, and discussed in his reports that are on Drs. Lee and Jones-Lee's website, [[www.gfredlee.com](http://www.gfredlee.com) in the San Joaquin River Delta section at <http://www.gfredlee.com/psjriv2.html>] the amount of Sacramento River in the San Joaquin River channel is dependent on the amount of south Delta water that is pumped from the Delta by the CVP and SWP; the Sacramento River is drawn through the Delta by and toward the export pumps. While the export pumps for those two projects will continue to draw south Delta water from the Southern Delta with half of total exports will coming from the north Delta facilities and, in the long-term alternative 4 will lead to increased exports and reduced outflow. These issues as well as others discussed herein need to be defined and evaluated before further consideration is given to the proposed BDCP diversion project.

A properly developed EIR/EIS would have included a detailed analysis of potential errors in predicting constituent concentrations in the various Delta channels and in predicting the changes in flow and associated impacts on constituent concentrations, distribution, and effects. As it stands now Chapter 8 of this EIR/EIS does not reliably inform the public or decision-makers about the magnitude of the errors in estimates and conclusions inherent in the BDCP analysis of the impact of the diversions on Delta water quality/beneficial uses.

## **Background to Comments**

Dr. G. Fred Lee has been involved and pioneered in graduate-level teaching, research, laboratory direction, consulting, and professional service in a myriad aspects of sources, fate, transport, and public health and environmental quality impacts of chemicals in natural waters (including lakes, reservoirs, rivers, estuaries, and nearshore marine waters) since the early 1960s; he has published nearly 1000 professional papers and reports on his work. Information on Drs. Lee and Jones-Lee's experience in these areas and publications are available on their website, [www.gfredlee.com](http://www.gfredlee.com); their involvement in, and publications concerning, the Sacramento San Joaquin River Delta specifically are addressed at <http://www.gfredlee.com/psjriv2.html>.

Drs. Lee and Jones-Lee began working on Delta water quality issues in the summer of 1989 when he was a Distinguished Professor and she was Associate Professor of Engineering at the New Jersey Institute of Technology. At that time they were contracted by Delta Wetlands, a proposed private project to develop water supply reservoirs in the Delta, to evaluate the expected water quality in the proposed reservoirs based on their more than 25 years of work on reservoir water quality in the USA and many other areas of the world. Their project involved collecting and reviewing existing Delta water quality and related data and assessing the anticipated water quality in the proposed Delta reservoirs for water supply and other beneficial uses, since it was to be Delta water that would be used to fill the proposed reservoirs.

Beginning in 2002 Drs. Lee and Jones-Lee became technical advisors to the San Joaquin River Deep Water Ship Channel (DWSC) Low-DO (dissolved oxygen) TMDL Steering Committee. That involvement led to their being appointed principal investigators (PIs) for a \$2-million CalFed project to investigate the causes of the low-DO problems in the DWSC. As project PIs they coordinated the studies of 12 investigators and developed synthesis reports for the project. In addition, they published additional papers and reports discussing the study findings and their significance and implications for water quality in Delta. Appendix A to these comments provides a brief description and citations with URLs for many of those writings; additional papers and reports on Delta water quality issues are available in the San Joaquin River & Delta section of their website (<http://www.gfredlee.com/psjriv2.html>). The SJR DWSC low DO TMDL project led to the development of,

Lee, G. F., and Jones-Lee, A., "Synthesis and Discussion of Findings on the Causes and Factors Influencing Low DO in the San Joaquin River Deep Water Ship Channel near Stockton, CA: Including 2002 Data," Report Submitted to SJR DO TMDL Steering Committee/Technical Advisory Committee and CALFED Bay-Delta Program, G. Fred Lee & Associates, El Macero, CA, March (2003). <http://www.gfredlee.com/SJR-Delta/SynthesisRpt3-21-03.pdf>

Lee, G. F. and Jones-Lee, A., "Supplement to Synthesis Report on the Low-DO Problem in the SJR DWSC," Report of G. Fred Lee & Associates, El Macero, CA, June (2004).

<http://www.gfredlee.com/SJR-Delta/SynthRptSupp.pdf>

and a number of other papers and reports on these studies. Further information on these studies is presented below.

Following the completion of the SJR DWSC DO TMDL synthesis report developed,

Lee, G. F. and Jones-Lee, A., “Overview of Sacramento-San Joaquin River Delta Water Quality Issues,” Report of G. Fred Lee & Associates, El Macero, CA (2004).  
<http://www.gfredlee.com/SJR-Delta/Delta-WQ-IssuesRpt.pdf>

Lee, G. F., and Jones-Lee, A., “Overview—Sacramento/San Joaquin Delta Water Quality,” Presented at CA/NV AWWA Fall Conference, Sacramento, CA, PowerPoint Slides, G. Fred Lee & Associates, El Macero, CA, October (2007).  
<http://www.gfredlee.com/SJR-Delta/DeltaWQCANVAWWAOct07.pdf>

The Lee and Jones-Lee (2004) Delta water quality report was the first comprehensive report on Delta water quality issues that examined the water quality implications of violations of water quality objectives in the Delta channels.

A major finding discussed therein was that the flow through the Delta channels impacted the location and magnitude of violations of water quality objectives in a Delta channel. While the importance of channel flow was impacting water quality/beneficial uses of the channel, it was pointed out that there was very little concrete understanding of how altering the channel flow impacted the water quality.

Of particular note with respect to addressing issues of the draft EIR/EIS Chapter 25 is Dr. Lee’s BA and MSPH degrees in public health and his PhD in environmental engineering with a minor with public health. Much of his work during his five-decades-long profession career has been in water quality research and consulting activities that address public health and water quality aspects of chemical and biological contaminants in the environment and drinking water.

In summary these comments on the adequacy of the BDCP draft EIR EIS to adequately and reliably present information on the impact of proposed diversion of 9,000 cfs of Sacramento River around the Delta began in 1989. Since then we have been active in review of Delta water quality issues including developing over 90 reports/papers on these issues. Further information on this experience is in

Lee, G. F., and Jones-Lee, A., “Experience in Reviewing Delta Water Quality Issues,” G. Fred Lee & Associates, El Macero, CA, April 3 (2011).  
<http://www.gfredlee.com/SJR-Delta/GFLAJL-Delta-EXP-REV.pdf>

### **Specific Comments on Draft EIR/EIS BDCP “Chapter 8 Water Quality”**

#### *“8.1 Readers’ Guide*

*Chapter 8, Water Quality, describes the environmental setting and potential impacts of the BDCP on water quality in and upstream of the Sacramento-San Joaquin Delta. The chapter provides the results of the evaluation of the effects of implementing the BDCP conservation measures on water quality constituents under a no action alternative and 15 different project alternatives.”*

Pages 8-15&16 Table 8-1 lists the beneficial uses of the Delta. An issue that needs to be acknowledged and understood is that Sacramento River flow into and through the Delta plays an important part in reducing the water quality impacts of regulated and unrecognized/unregulated pollutants added to Delta water, both by its dilution of pollutant concentration and by decreasing

the pollutant residence times in the Delta. The reduction in Sacramento River flow into and through the Delta that will result from the proposed plan will be expected to increase the water quality and public health significance of unrecognized/unregulated pollutants in the Delta waters. These issues were discussed in the following presentations and writings:

Lee, G. F., and Jones-Lee, A., "Enhanced Delta Flows Needed to Help Control Water Quality Impacts of Delta Pollutants," Testimony for CA State Water Resources Control Board Public Workshop: Comprehensive (Phase 2) Review & Update to Bay-Delta Plan Workshop 1: Ecosystem Changes and the Low Salinity Zone, Sacramento, CA, September 5, 2012, Report of G. Fred Lee & Associates, El Macero, CA, August 17 (2012).  
[http://www.gfredlee.com/SJR-Delta/Lee\\_Testimony\\_BayDelta\\_Workshop\\_1.pdf](http://www.gfredlee.com/SJR-Delta/Lee_Testimony_BayDelta_Workshop_1.pdf)

Lee, G. F., and Jones-Lee, A., "Discussion of Water Quality Issues That Should Be Considered in Evaluating the Potential Impact of Delta Water Diversions/Manipulations on Chemical Pollutants on Aquatic Life Resources of the Delta," Report of G. Fred Lee & Associates, El Macero, CA, February 11 (2010).  
[http://www.gfredlee.com/SJR-Delta/Impact\\_Diversions.pdf](http://www.gfredlee.com/SJR-Delta/Impact_Diversions.pdf)

Lee, G. F., and Jones-Lee, A., "Comments on Water Quality Issues Associated with SWRCB's Developing Flow Criteria for Protection of the Public Trust Aquatic Life Resources of the Delta," Submitted to CA State Water Resources Control Board as part of Public Trust Delta Flow Criteria Development, by G. Fred Lee & Associates, El Macero, CA, February 11 (2010).  
[http://www.gfredlee.com/SJR-Delta/Public\\_Trust\\_WQ.pdf](http://www.gfredlee.com/SJR-Delta/Public_Trust_WQ.pdf)

The proposed BDCP diversion of Sacramento River water around the Delta rather than continuing to allow river water to flow through the Delta to the CVP and SWP diversions will be detrimental to Delta water quality.

Section 8.2.1.8 beginning on Page 8-25 presents a review of "water quality constituents of concern," and makes mention of some of the unrecognized pollutants. That section, however, does not adequately address this issue. There are many more unregulated and unrecognized potential pollutants that could be impacting Delta water quality beneficial uses; these issues are reviewed in:

Lee, G. F., and Jones-Lee, A., "Unrecognized Environmental Pollutants," Water Encyclopedia: Surface and Agricultural Water, Wiley, Hoboken, NJ pp 371-373 (2005).  
<http://www.gfredlee.com/SurfaceWQ/WileyUnrecognizedPollutants.pdf>

Volume 13 Number 1, January 12, 2010 - Topics: Impacts of unmonitored, unregulated, and unrecognized chemicals in the aquatic systems.  
[www.gfredlee.com/Newsletter/swnewsV13N1.pdf](http://www.gfredlee.com/Newsletter/swnewsV13N1.pdf)

As noted, above the proposed BDCP diversion of Sacramento River water around the Delta will be adverse to beneficial uses of the Delta due by enhancing the water quality impacts of unregulated and unregulated potential pollutants.

Page 8-26 lines 16-17 states, "*Excess nutrients can cause blooms of nuisance algae and aquatic*

*vegetation, and their decay can result in depleted DO.*” The draft does not adequately address the at least equally, and in some areas, more significant impacts of aquatic macrophytes on aquatic life (fish) habitat and recreational use (boating) in the Delta.

Page 8-36 lines 20-22 state, “*Nutrient concentrations currently in the Delta are high enough that they are probably not a true limiting factor for overall algal growth, and therefore increases in ammonia generally will not lead to an increase in algal growth (Jassby et al. 2002:1).*” It should be noted that the Central Valley Regional Water Quality Control Board (CVRWQCB) recently established a limit on the release of ammonia in city of Stockton wastewater discharges to the SJR on the belief that that ammonia is significant in stimulating the growth of algae in Southern California water supply reservoirs, causing tastes and odors in the water supply.

Page 8-47 presents a discussion of PCB-pollution of the Delta. That discussion is highly deficient in that it fails to mention the large amount of work that has been done on PCB accumulation in fish in the Delta and Delta tributaries. In 2002 Dr. Lee reviewed the extensive data on PCBs in fish of the Central Valley on behalf of the State Water Resources Control Board (SWRCB)/CVRWQCB. From that work, Lee and Jones-Lee developed the following reports:

Lee, G. F. and Jones-Lee, A., "Organochlorine Pesticide, PCB and Dioxin/Furan Excessive Bioaccumulation Management Guidance," California Water Institute Report TP 02-06 to the California Water Resources Control Board/Central Valley Regional Water Quality Control Board, 170 pp, California State University Fresno, Fresno, CA, December (2002).  
<http://www.gfredlee.com/SurfaceWQ/OCITMDLRpt12-11-02.pdf>

Lee, G. F., and Jones-Lee, A., “Update of Organochlorine (OCI) ‘Legacy’ Pesticide and PCB Concentrations in Delta and Central Valley Fish,” Report of G. Fred Lee & Associates, El Macero, CA, September 10 (2007).  
<http://gfredlee.com/SurfaceWQ/UpdateLegacyPestCVFish.pdf>

As discussed in those reports, the PCB-pollution of Delta and Delta tributary fish is a major water quality issue in the Central Valley waterways, sufficient to render the consumption of some large game fish such as largemouth bass hazardous to human health. While the California Office of Environmental Health Hazard Assessment (OHHEA) has reported that the levels of legacy chlorinated hydrocarbon pesticides such as DDT/DDE in fish tissue has been decreasing, the PCB content of Central Valley fish has not decreased.

Pages 8-51&52 present some information on the low-DO situation in the SJR DWSC. That discussion is deficient, however, in that it fails to discuss how manipulation of SJR DWSC flow has been, and still can be, a major factor in causing low-DO conditions in the DWSC. As discussed in reports cited in the Background section of these comments and Appendix A, the export of Delta waters by the CVP and SWP is a major contributor to low DO in the DWSC. The draft EIR/EIS fails to adequately discuss the current situation concerning the low DO in DWSC. As written, it misleads a reader to believe that the installation and operation an aeration system will control the low-DO situation in the DWSC. It also fails to discuss that there are no funds available to operate an aeration system in a manner to control the low DO that can result from the residual oxygen demand contributed from agricultural sources. Agricultural sources contribute algal nutrients to the upstream SJR waters; those nutrients support the growth of algae

that cause significant oxygen demand in the DWSC especially under low-flow conditions in the SJR DWSC. The loss of Sacramento River water in the ship channel will potentially expand the downstream range of dissolved oxygen problems. Information on the current low-DO situation in the SJR DWSC is available in the following reports:

Lee, G. F., Comments on SJR DWSC Low-DO issues discussed at March 28, 2012 BDCP meeting. Comments submitted to J. Grindstaff, Executive Officer, Delta Stewardship Council, by G. Fred Lee & Associates, El Macero, CA, April 28 (2012).  
[http://www.gfredlee.com/SJR-Delta/Comments\\_SJR\\_DO\\_Issues\\_DSC.pdf](http://www.gfredlee.com/SJR-Delta/Comments_SJR_DO_Issues_DSC.pdf)

Lee, G. F., and Jones-Lee, A., "Background Information on SJR Upstream Oxygen Demand Control Issues," Prepared for San Joaquin River Technical Work Group, Report of G. Fred Lee & Associates, El Macero, CA, July 11 (2010).  
<http://www.gfredlee.com/SJR-Delta/Bkgrnd-SJR-DO.pdf>

Lee, G. F., and Jones-Lee, A., "Issues in Controlling the Residual Oxygen Demand in the SJR DWSC That Leads to DO WQO Violations," Report of G. Fred Lee & Associates, El Macero, CA, November 3, 2010; updated February 6 (2011).  
<http://www.gfredlee.com/SJR-Delta/Residual-Ox-Demand-DWSC.pdf>

As discussed in those reports, algal nutrients discharged by irrigated agriculture in the Grasslands Project area needs to be controlled in order to control algal growth in the SJR that contributes to the residual oxygen demand in the DWSC that can lead to low-DO conditions. The control of that source is especially important under the proposed plan that would divert Sacramento River water around the Delta, in order to mitigate the impact of the loss of Sacramento River on the low-DO situation in the SJR DWSC. The control of algal nutrients upstream in the SJR could greatly reduce, if not eliminate, the need for an aeration system.

Page 8-52 lines 36-37 states, "*EC and TDS values tend to be highly correlated because the majority of chemicals that contribute to TDS are charged particles that impart conductance of water.*" It is incorrect to describe ions that contribute to electrical conductivity as "charge particles." The ions are not particles.

Pages 8-69 through 8-74 are devoted to "Nitrate/Nitrite and Phosphorus" in the Delta. That discussion is significantly deficient as it does not adequately discuss problems with the Gilbert discussion of N/P ratios as factor in influencing fish populations in the Delta. While those issues were discussed in an earlier section of the draft EIR/EIS, they are not discussed in the section that focuses on these issues on pages 8-70 and 8-71. When Gilbert first proposed to rely on N/P ratios, we developed the paper cited below to address the unreliability of that approach.

Lee, G. F., and Jones-Lee, A., "Comments on the Adequacy of C. Dahm's Discussion of Delta Eutrophication Issues & Delta N/P Ratios as a Cause of Adverse Impact on Delta Fish," Comments to Delta Stewardship Council, Report of G. Fred Lee & Associates, El Macero, CA, November 17 (2011). <http://www.gfredlee.com/SJR-Delta/DSC-Comments-Dahm-Eutroph.pdf>

Lee, G. F., and Jones-Lee, A., “Comments on P. Glibert Defense of N/P Ratios as Major Influence on Aquatic Ecosystems Composition in Delta,” Report of G. Fred Lee & Associates, El Macero, CA, September 17 (2012).  
[http://www.gfredlee.com/SJR-Delta/Comments\\_Glibert\\_NPRatio.pdf](http://www.gfredlee.com/SJR-Delta/Comments_Glibert_NPRatio.pdf)

The BDCP draft EIR/EIS Water Quality Chapter 8 should have discussed the findings presented in Dr. Erwin van Nieuwenhuysen’s professional workshop presentation and publication concerning the response in average summer chlorophyll concentration in the Delta to an abrupt and sustained reduction in phosphorus discharge from the Sacramento Regional Wastewater Treatment Plant. His presentation slides are available at <http://www.cwemf.org/workshops/DeltaNutrientsWrkshp/VanNieuwenhuysen.pdf> and his published paper is:

vanNieuwenhuysen, E., “Response of Summer Chlorophyll Concentration to Reduced Total Phosphorus Concentration in the Rhine River (Netherlands) and the Sacramento– San Joaquin Delta (California, USA),” *Can. J. Fish. Aquatic, Sci.* 64(11):1529-1542 (2007).  
[<http://www.ingentaconnect.com/content/nrc/cjfas/2007/00000064/00000011/art00006>]

His presentation and paper provided important information on the impact of phosphorus discharges from that facility on planktonic algae in the Delta. He found that the changes in the fish production and ecosystem in Delta that occurred was more likely a result of the decrease in phosphorus discharged rather than of a change in N/P ratios.

Another issue that was not properly addressed in the draft EIR/EIS is that particulate inorganic phosphorus is largely not available to support algal growth. This issue has been reviewed in a number of publications including:

Lee, G. F., “A Proposal for Assessing Algal-Available Phosphorus Loads in Runoff from Irrigated Agriculture in the Central Valley of California,” Report of G. Fred Lee & Associates, El Macero, CA, November (2006).  
<http://www.gfredlee.com/Nutrients/AlgalAssayAvailP.pdf>

Lee, G. F., “Assessing Algal Available Phosphorus,” Submitted for Inclusion in the Proceedings of US EPA Science Symposium: “Sources, Transport, and Fate of Nutrients in the Mississippi River and Atchafalaya River Basins,” Minneapolis, MN, November 7-9 (2006).  
<http://www.gfredlee.com/Nutrients/AvailPEPASymp06.pdf>

Lee, G. F., and Jones-Lee, A., "Assessing the Water Quality Significance of N & P Compound Concentrations in Agricultural Runoff," Invited Paper Presented at Agrochemical Division, American Chemical Society National Meeting, San Francisco, CA, September (2006).  
<http://www.gfredlee.com/Nutrients/N-PRunoffACS.pdf>

It is the algal-available P load to the Delta –soluble ortho P as well as algal-cell phosphorus – that needs to be the focus of phosphorus control programs to control excessive algal growth in Delta waters.



Pages 8-162 & 8-163 present a discussion of organic carbon. That discussion should include the findings reported in:

Lee, G. F., "Synopsis of G. Fred Lee and Anne Jones-Lee's Work on Domestic Water Supply Water Quality, and TOC Issues in the Sacramento/San Joaquin River Delta," Report of G. Fred Lee & Associates, El Macero, CA (2004).  
<http://www.gfredlee.com/SJR-Delta/GFL-DeltaTOCWork.pdf>

Lee, G. F. and Jones-Lee, A., "Issues that Need to Be Considered in Evaluating the Sources and Potential Control of TOC that Leads to THMs for Water Utilities that Use Delta Water as a Water Supply Source," Report of G. Fred Lee & Associates, El Macero, CA, May (2003).  
[http://www.gfredlee.com/SJR-Delta/TOC\\_update.pdf](http://www.gfredlee.com/SJR-Delta/TOC_update.pdf)

Pages 8-164 devoted to pesticides fails to mention the comprehensive review of the organochlorine legacy pesticides such as DDT that are still present in Delta tributary soils and sediments and contribute to the presence of some of these pesticides in some fish in the Delta and Delta tributaries in concentrations that represent a threat to human health. These issues are reviewed in:

Lee, G. F. and Jones-Lee, A., "Organochlorine Pesticide, PCB and Dioxin/Furan Excessive Bioaccumulation Management Guidance," California Water Institute Report TP 02-06 to the California Water Resources Control Board/Central Valley Regional Water Quality Control Board, 170 pp, California State University Fresno, Fresno, CA, December (2002).  
<http://www.gfredlee.com/SurfaceWQ/OCITMDLRpt12-11-02.pdf>

Lee, G. F., and Jones-Lee, A., "Update of Organochlorine (OCI) 'Legacy' Pesticide and PCB Concentrations in Delta and Central Valley Fish," Report of G. Fred Lee & Associates, El Macero, CA, September 10 (2007).  
<http://www.gfredlee.com/SurfaceWQ/UpdateLegacyPestCVFish.pdf>

While OEHHA has been finding that DDT concentrations in Central Valley fish are decreasing they remain sufficiently high in some fish to be of human health concern.

Lee, G. F. and Jones-Lee, A., "Organochlorine Pesticide, PCB and Dioxin/Furan Excessive Bioaccumulation Management Guidance," California Water Institute Report TP 02-06 to the California Water Resources Control Board/Central Valley Regional Water Quality Control Board, 170 pp, California State University Fresno, Fresno, CA, December (2002).  
<http://www.gfredlee.com/SurfaceWQ/OCITMDLRpt12-11-02.pdf>

Lee, G. F., and Jones-Lee, A., "Update of Organochlorine (OCI) 'Legacy' Pesticide and PCB Concentrations in Delta and Central Valley Fish," Report of G. Fred Lee & Associates, El Macero, CA, September 10 (2007).  
<http://www.gfredlee.com/SurfaceWQ/UpdateLegacyPestCVFish.pdf>

Page 8-166 devoted to phosphorus fails to discuss key issues concerning the importance of phosphorus in impacting Delta water quality discussed above. Of particular importance is the work of vanNieuwenhuysen (2007) that found that when the phosphorus load to the Delta was decreased, the phytoplankton concentrations also decreased.

Page 8-173 begins Section 8.4.2 Determination of Effects. The comments presented below concerning this section focus on the BDCP's assessment of the impacts of the proposed BDCP diversion of Sacramento River water around the Delta on Delta water quality as presented in 8.4.3.9 Alternative 4 – Dual Conveyance with Modified Pipeline/Tunnel and Intakes 2, 3, and 5 (9,000 cfs; Operational Scenario H) that begins on page 8-407. These comments are also applicable to the other identified alternatives identified in the document.

Page 8-173 Section 8.4.2.1 Screening Analysis and Results beginning on line 16 states:  
*“This water quality analysis assessed the potential effects of implementing the various alternatives on 182 constituents (or classes of constituents). The initial analysis of water quality effects, referred to as the “screening analysis” in the Methods of Analysis section (above) resulted in the following findings. Of the 182 constituents, 110 were determined to have no potential to be adversely affected by the alternatives to an extent to which adverse environmental effects would be expected. Historical data for these constituents showed no exceedances of water quality objectives/criteria in the major Delta source waters, were not on the State’s 303(d) list in the affected environment, were not of concern based on professional judgment or scoping comments, and had no potential for substantial long-term water quality degradation. Consequently, no further analyses were performed for these 110 constituents.”*

The approach described for excusing particular constituents from further consideration of impact was imprudent. Such disregard may well result in not considering water quality parameters that are present in one or more of the Delta channels at concentrations just under current water quality criteria/standards/objectives and may well be of concern once the Sacramento River flow is reduced as proposed, and under future revisions of the US EPA water quality criteria, state of California water quality objectives, and regional boards' basin plan objectives. Further it is well-recognized that some of the current water quality criteria, state standards, and Basin Plan objectives are not protective of the beneficial uses of water. Also the BDCP approach for selecting the chemical constituents for analysis of impacts of diverting Sacramento River flow ignores the well established facts of additive and synergistic impacts of chemical where two or more chemicals that exist at less than toxic concentrations can be combined to cause toxicity.

As summarized in writings referenced in Appendix A, Dr. Lee has extensive experience in developing water quality criteria and state standards, and in their implementation in discharge limits for the protection of beneficial uses of waterbodies. On numerous occasions he has been asked to serve as an independent technical peer-reviewer of federal and state water quality criteria and standards. He and Dr. Jones-Lee have published several papers and reports on their work and findings in these areas including:

Lee, G. F., and Jones-Lee, A., “Clean Water Act, Water Quality Criteria/Standards, TMDLs, and Weight-of-Evidence Approach for Regulating Water Quality,” Water Encyclopedia: Water Law and Economics, Wiley, Hoboken, NJ, pp 598-604 (2005).  
<http://www.gfredlee.com/SurfaceWQ/WileyCleanWaterAct.pdf>

Lee, G. F. and Jones-Lee, A., "Appropriate Use of Numeric Chemical Water Quality Criteria," Health and Ecological Risk Assessment, 1:5-11 (1995).  
<http://www.gfredlee.com/SurfaceWQ/chemcri.pdf>

Lee, G. F., Jones, A., and Newbry, B., "Water Quality Standards and Water Quality," *Journ. Water Pollut. Control Fed.* 54(7):1131-1138 (1982).  
<http://www.gfredlee.com/SurfaceWQ/WQStds-WaterQuality.pdf>

The draft BDCP EIR/EIS discussion of anticipated water quality impacts of the proposed plan did not appropriately or adequately address the fact that the concentrations and distribution/locations of regulated and unregulated/inadequately regulated chemicals, whether or not they have or are presently known to exceed regulatory limits, will be expected to be altered by the diversion of large amounts of Sacramento River water around the Delta. This will be expected to affect the water quality impacts of regulated and unregulated/inadequately regulated chemicals in Delta waters. The BDCP's dismissing from further analysis of potential water quality effects, constituents that it concluded based on inadequate evaluation and without appropriate attention to the impact of the loss of Sacramento River water to the system, had not exceeded water quality objectives/criteria in the major Delta source waters, were not on the State's 303(d) list in the affected environment, or were not of concern, renders the draft EIR/EIS fundamentally flawed. That flaw alone is sufficiently significant to merit the denial of certification of this draft EIR/EIS.

As discussed in our review of the Delta Water Quality report cited below, as part of SWRCB water rights decision D-1641, several agencies, through the Interagency Ecological Program (IEP), conduct an Environmental Monitoring Program (EMP) that is supposed to provide information on the impacts of Delta water exports to central and Southern California on Delta resources and water quality.

Lee, G. F. and Jones-Lee, A., "Overview of Sacramento-San Joaquin River Delta Water Quality Issues," Report of G. Fred Lee & Associates, El Macero, CA (2004).  
<http://www.gfredlee.com/SJR-Delta/Delta-WQ-IssuesRpt.pdf>

A critical review of the IEP EMP, however, shows that it falls short of adequately defining the full range of water quality impacts of the export of Delta water by the federal project (Central Valley Project – CVP) and state project (State Water Project – SWP). In 2004 Dr. Lee was a member of the peer-review panel that reviewed the adequacy of the IEP water quality monitoring program. In that forum he pointed out that that program was highly deficient in providing the information needed to evaluate the impacts of the SWP diversions on Delta water quality. His comments were ignored, and even today large amounts of money continue to be spent on Delta monitoring but are not directed to the stated purpose of the D-1641 water rights decision that allowed the SWP to divert large amounts of water from the Delta.

The CVRWQCB and SWRCB have been trying for several years, without success, to develop a comprehensive Delta water quality monitoring program. The basic problem is a lack of funding for such a program. If the BDCP-proposed Delta diversion project is allowed to be implemented, those benefiting from the project should be required to fund a comprehensive water quality monitoring program to adequately define the impacts of that diversion on Delta water quality.

Page 8-407 begins the discussion of Section 8.4.3.9, Alternative 4 – Dual Conveyance with Modified Pipeline/Tunnel and Intakes 2, 3, and 5 (9,000 cfs; Operational Scenario H). This

section states, “Alternative 4 would comprise physical/structural components similar to those under Alternative 1A, however, there are notable differences. Alternative 4 would convey up to 9,000 cfs of water from the north Delta to the south Delta and that Alternative 4 would include an operable barrier at the head of Old River. Diverted water would be conveyed through pipelines/tunnels from three screened intakes (i.e., Intakes 2, 3 and 5) located on the east bank of the Sacramento River between Clarksburg and Courtland. Alternative 4 would include a 245 acre intermediate forebay at Glannvale Tract. Clifton Court Forebay would be dredged and expanded by approximately 690 acres to the southeast of the existing forebay. Water supply and conveyance operations would follow the guidelines described as Scenario H1, H2, H3, or H4, which variously include or exclude implementation of fall X2 and/or enhanced spring outflow. Conservation Measures 2–22 would be implemented under this alternative, and would be the same as those under Alternative 1A.”

The subsection, “Effects of the Alternative on Delta Hydrodynamics,” begins on page 408 with: “*Under the No Action Alternative and Alternatives 1–9, the following two primary factors can substantially affect water quality within the Delta:*

- *Within the south, west, and interior Delta, a decrease in the percentage of Sacramento River-sourced water and a concurrent increase in San Joaquin River-sourced water can increase the concentrations of numerous constituents (e.g., boron, bromide, chloride, electrical conductivity, nitrate, organic carbon, some pesticides, selenium). This source water replacement is caused by decreased exports of San Joaquin River water (due to increased Sacramento River water exports), or effects of climate change on timing of flows in the rivers. Changes in channel flows also can affect water residence time and many related physical, chemical, and biological variables.*
- *Particularly in the west Delta, sea water intrusion as a result of sea level rise or decreased Delta outflow can increase the concentration of salts (bromide, chloride) and levels of electrical conductivity. Conversely, increased Delta outflow (e.g., as a result of Fall X2 operations in wet and above normal water years) will decrease levels of these constituents, particularly in the west Delta.”*

As discussed in these comments, not only would the concentrations of the mentioned constituents increase with increases in the proportion of San Joaquin River water but also the concentrations of many other known pollutants as well as unregulated, unrecognized and inadequately regulated pollutants be increased. For some constituents the concentrations would be expected to increase in some Delta channels to levels in excess of water quality objectives and in some cases significantly impact Delta water quality. The draft EIR/EIS is deficient in that it fails to address this issue. Also, decreases in the amount of Sacramento River water in the Delta will result in changes in the areas in which adverse impacts on Delta channel water quality occur.

The draft EIR EIS fails to mention that increasing the concentrations of pollutants that are already causing water quality objectives is a violation of SWRCB/CVRWQCB antidegradation issues that preclude degrading existing water quality of causing a degradation of water quality that causes and water quality objective violation.

Page 8-432 lines 39-43 and page 8-433 lines 1-2 state,

*“Amounts of oxygen demanding substances present (e.g., ammonia, organics) in the reservoirs and rivers upstream of the Delta, rates of photosynthesis (which is influenced by nutrient levels/loading), and respiration and decomposition of aquatic life is not expected to change sufficiently under Alternative 4 to substantially alter DO levels relative to Existing Conditions or the No Action Alternative. Any minor reductions in DO levels that may occur under this alternative would not be expected to be of sufficient frequency, magnitude and geographic extent to adversely affect beneficial uses, or substantially degrade the quality of these water bodies, with regard to DO.”*

That assessment ignores the importance of Sacramento River water currently drawn into the Delta by the current export projects, CVP and SWP, in the existing DO levels in the Delta, and the effect on DO that the reduction of that flow as proposed would have. As discussed in the synthesis report cited below, the flow of the Sacramento River water through the Delta limits the downstream extent of the low-DO conditions in the SJR DWSC to Turner Cut. With the reduced Sacramento River flow into the Central Delta as proposed, the lower SJR DWSC could experience low-DO conditions.

Lee, G. F., and Jones-Lee, A., "Synthesis and Discussion of Findings on the Causes and Factors Influencing Low DO in the San Joaquin River Deep Water Ship Channel near Stockton, CA: Including 2002 Data," Report Submitted to SJR DO TMDL Steering Committee/Technical Advisory Committee and CALFED Bay-Delta Program, G. Fred Lee & Associates, El Macero, CA, March (2003). <http://www.gfredlee.com/SJR-Delta/SynthesisRpt3-21-03.pdf>

As discussed in our reports the current operation of the CVP and SWP draws SJR water that enters the DWSC to the export pumps at Turner Cut. This has important implications for the homing of Chinook Salmon to SJR watershed spawning waters since there is no homing signal as the fish enter San Francisco Bay/Delta to guide them to their home stream waters. We have discussed this issue in,

Lee, G. F., and Jones-Lee, A., “Need for SJR Watershed Water to Reach San Francisco Bay,” Comments submitted to Delta Stewardship Council, Sacramento, CA by G. Fred Lee & Associates, El Macero, CA, May 22 (2011). <http://www.gfredlee.com/SJR-Delta/NeedSJRtoSFBay.pdf>

Page 8-433 lines 13 through 21 state,

*Under all operational scenarios of Alternative 4, minor DO level changes could occur due to nutrient loading to the Delta relative to Existing Conditions and the No Action Alternative (see WQ-1, WQ-15, WQ-23). The state has begun to aggressively regulate point-source discharge effects on Delta nutrients, and is expected to further regulate nutrients upstream of and in the Delta in the future. Although population increased in the affected environment between 1983 and 2001, average monthly DO levels during this period of record show no trend in decline in the presence of presumed increases in anthropogenic sources of nutrients (see Table 4.4-15 in the ES/AE section). Based on these considerations, excessive nutrients that would cause low DO levels would not be expected to occur under any operational scenario of Alternative 4.*

Based on Dr. Lee’s more than five decades of experience assessing the impacts of nutrients on DO in waterbodies throughout the world and his 25 years of experience in investigating nutrient

sources and impacts in the Delta watershed and within the Delta, it is misleading to characterize the current SWRCB efforts in developing nutrient objectives as having “*begun to aggressively regulate*” nutrient discharges. It will be many years before reliable and workable nutrient objectives will be available that can be used to regulate nutrient discharges from agricultural sources in the Delta watershed. As discussed above the major cause of the residual oxygen demand and low-DO in the SJR DWSC is nutrient input from upstream agricultural sources that stimulates the growth of algae in the DWSC which because of the flow-related residence time, are able to decompose in the DWSC where their bacterial decomposition exerts greater oxygen demand than can be assimilated.

We have developed several paper/reports on the impact of and controlling nutrients in SJR watershed including.

Lee, G. F., and Jones-Lee, A., “Potential Water Quality Impacts of Agriculture Runoff/Discharges in the Central Valley of California,” Presented at Central Coast Agricultural Water Quality Coalition’s 2007 National Conference on Agriculture & the Environment, Monterey, CA, PowerPoint Slides, G. Fred Lee & Associates, El Macero, CA, November (2007).

<http://www.gfredlee.com/SJR-Delta/SJRAgImpactsMontereyNov2007.pdf>

Lee, G. F., and Jones-Lee, A., “Synopsis of CWEMF Delta Nutrient Water Quality Modeling Workshop – March 25, 2008, Sacramento, CA,” Report of G. Fred Lee & Associates, El Macero, CA, May 15 (2008). [http://www.gfredlee.com/SJR-Delta/CWEMF\\_WS\\_synopsis.pdf](http://www.gfredlee.com/SJR-Delta/CWEMF_WS_synopsis.pdf)

“Overview of Delta Nutrient Water Quality Problems: Nutrient Load – Water Quality Impact Modeling,” Agenda for Technical Workshop sponsored by California Water and Environmental Modeling Forum (CWEMF), Scheduled for March 25, 2008 in Sacramento, CA (2008).

[http://www.gfredlee.com/SJR-Delta/CWEMF\\_Workshop\\_Agenda.pdf](http://www.gfredlee.com/SJR-Delta/CWEMF_Workshop_Agenda.pdf)

An issue that needs to be addressed by the SWP is the low-DO situation that occurs in the southern-most part of Old River channel in the South Delta in the vicinity of the Tracy Boulevard Bridge. The SWP export pumping of South Delta water resulted in major flow problems in the South Delta. The temporary barriers constructed to try maintain the water levels in the South Delta channels to enable agriculture to continue to pump irrigation water from the channel have restricted the flow in the southern-most part of Old River channel sufficiently to allow large-scale algal growth and die-off leading to low DO in the channel. As part of an extension of the SJR DWSC Low-DO TMDL project, we organized a boat tour of the South Delta channels on August 5, 2004. The DeltaKeeper (Bill Jennings) made available a DK boat and crew that enabled several members of the CVWQCB and CalFed staff to accompany Lee on this tour. During the tour the evidence of a large fish kill that had occurred the evening before was observed near the Tracy Blvd Bridge; hundreds of dead fish were observed floating on the surface of the water. The DWR maintains a DO monitoring station in the region of the fish kill, which showed that the previous night the DO in the channel dropped to near-zero. A report on that tour and the fish kill is presented in,

Lee, G. F.; Jones-Lee, A. and Burr, K., "Results of the August 5, 2003, Tour of the South Delta Channels," Report of G. Fred Lee & Associates, El Macero, CA, February (2004).

<http://www.gfredlee.com/SJR-Delta/South-Delta-Tour.pdf>

Lee, G. F., "Comments on SWRCB Review of South Delta Channel Water Quality," Report of G. Fred Lee & Associates, El Macero, CA, January 15 (2011).  
<http://www.gfredlee.com/SJR-Delta/SoDeltaWQ1-11.pdf>

Review of the data from the DWR monitoring station at that location shows frequent DO water quality objective violations occurred in this channel. That situation has been occurring for many years. It is clear that DWR as part of the SWP should be required to eliminate the low-DO problems that occur in the South Delta as a result of the operation of the SWP.

The low DO in the Old River channel is the result of high nutrient and algal loads in SJR that enters Old River at the Head of Old River and the lack of adequate flow of the channel due to the barrier constructed to maintain water levels in the Old River Channel.

Page 8-435 lines 17-20 states with regard to NEPA Effects:

*"CM2–CM22 would not be expected to contribute to adverse DO levels in the Delta. The increased habitat provided by CM2–CM11 could contribute to an increased biochemical or sediment demand, through contribution of organic carbon and the action of plants decaying. However, similar habitat exists currently in the Delta and is not identified as contributing to adverse DO conditions."*

Dr. Lee has considerable experience in examining the character of water discharged from wetlands; he conducted some of the first work done on the impacts of wetlands on water quality, which was discussed in the following paper:

Lee, G. F., Bentley, E., and Amundson, R., "Effects of Marshes on Water Quality," IN: Ecological Studies 10, Coupling of Land and Water Systems, Springer-Verlag, New York, pp. 105-127 (1975). <http://www.gfredlee.com/SurfaceWQ/MarshesBentleyAmundson.pdf>

Based on the monitoring programs and studies that have been conducted in the Delta, it is inappropriate to use the range of DO found in low-flow channels that receive predominately tidal flow from wetlands. The development of wetlands as part of establishing additional shallow habitat as part of the proposed BDCP Delta improvement.

Page 8-435 lines 25-27 states:

*"CM14, an oxygen aeration facility in the Stockton Deep Water Ship Channel to meet TMDL objectives established by the Central Valley Water Board, would maintain DO levels above those that impair fish species when covered species are present."*

As discussed elsewhere in these comments, the implementation of an aeration facility in the SJR DWSC to eliminate DO water quality objectives since the funding for construction and operation is not available. Further there are significant questions about whether the proposed aeration facility can prevent DO depletions below the water quality objective especially in the near bottom waters of the DWSC so that there are no more than one violation of the DO objective in any amount more than once every three years.

Page 8-440 lines 44-45 and page 8-441 lines 1-3 states:

*“In addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP, as set forth in EIR/EIS Appendix 3B, Environmental Commitments, a separate, non-environmental commitment to address the potential increased water treatment costs that could result from EC concentration effects on municipal, industrial and agricultural water purveyor operations.”*

While it may be possible to pay water utilities and agricultural interests as compensation for impact of increased salinity due to the diversion of Sacramento River around the Delta, an issue that needs to be considered is the impact of increased salinity in domestic waters on the recharge of domestic wastewaters. An increase in the salinity in a municipality’s water supply can lead to restrictions on the recharge of its domestic wastewaters as part of groundwater replenishment projects. This is already an issue in the use of Delta waters as a water supply for some Southern California municipalities. It can be very expensive to treat a domestic wastewater to achieve groundwater recharge limits.

Page 8-447-261. The section on the Effects of Nitrate Concentrations Resulting from Facilities Operations and Maintenance (CM1) that begins on line 13 needs to be expanded to include the impact of the CVRWQCB’s recent adoption of reduced nitrate loads to the SJR and Delta from the Stockton waste water treatment plant.

Page 8-407 line 32 begins the presentation of Section 8.4.3.9 Alternative 4 – Dual Conveyance with Modified Pipeline/Tunnel and Intakes 2, 3, and 5 (9,000 cfs; Operational Scenario H). Many of the issues discussed above in reference to Alternative 4 are applicable to all of the alternatives involved in diversion of Sacramento River water around the Delta. While the relative reduction in the amount of diversion could be expected to lessen or increase the magnitude of some of the impacts, those impacts would still need to be better defined.

Page 8-700 line 28 begins the discussion of 8.4.3.16 Alternative 9—Through Delta/Separate Corridors (15,000 cfs; Operational Scenario G). The diversion of Sacramento River water through the Delta via isolated facilities would lead to many of the same adverse impacts noted above for diversion of Sacramento River water around the Delta via tunnels and or canals.

Page 8-771 line 15 begins a list of references for this draft EIR/EIS. While the list of references is voluminous, as noted in these comments there are a number of key, pertinent papers and reports not included in this list that should have been reviewed, discussed, and referenced in a certifiable EIR/EIS for the proposed BDCP project. The exclusion of those sources contributed to the deficiencies discussed in these comments.

### **Additional Comments**

The limitations of the ability of DWR to provide reliable information on flow of water in Delta channels occurred when we were trying to understand the flow of Sacramento River and the San Joaquin River through the Central Delta as part of our work on SJR DWSC Low-DO TMDL project. We were unable to obtain from DWR modeling staff the respect flows in the Central Delta channels as a function of SJR, Sacramento River, Old River flows and export pumping by the CVP SWP. This situation still exists today. This is the type of information that is needed to



begin to reliably evaluate the impact of diversion of Sacramento River flow around or through the Delta.

MBK Engineers conducted a detailed review of BDCP modeling; Walter Bourez of MBK Engineers presented to the DISB his findings on one of the models used in the BDCP draft EIR/EIS which differed from those presented by BDCP. (He used a 2013 version of the model, rather than the 2009 model BDCP used.)

MBK Engineers concluded in its presentation to the Delta Independent Science Board (2014), *“An initial review led the Reviewers to conclude that the BDCP Model, which serves as the basis for the environmental analysis contained in the BDCP Environmental Impact Report/Statement (EIR/S), provides very limited useful information to understand the effects of the BDCP. The BDCP Model contains erroneous assumptions, errors, and outdated tools, which result in impractical or unrealistic Central Valley Project (CVP) and State Water Project (SWP) operations. The unrealistic operations, in turn, do not accurately depict the effects of the BDCP.”*

MBK Engineers presentation to Delta Independent Science Board (2014)

The Delta Independent Science Board (DISB) is required by the Delta Reform Act of 2009 to review the BDCP draft EIR/EIS and to submit its comments to the Delta Stewardship Council and the Department of Fish and Game. In its May 15, 2014 cover letter transmitting its comments pursuant to that requirement

[<http://deltacouncil.ca.gov/sites/default/files/documents/files/Attachment-1-Final-BDCP-comments.pdf>], the DISB acknowledged the monumental task faced by the preparers of the draft EIR/EIS but expressed the following conclusion:

*“We find, however, that the science in this BDCP effort falls short of what the project requires. We highlight our concerns in the attached report. The report, in turn, draws on our detailed responses to charge questions from the Delta Stewardship Council (Appendix A) and on our reviews of individual chapters in the DEIR/DEIS (Appendix B). Our concerns raise issues that, if not addressed, may undermine the contributions of BDCP to meeting the co-equal goals for the Delta.”*

The DISB report transmitted by that letter, cited below, begins with the following summary:

*“Summary of Major Concerns*

*Does the Bay Delta Conservation Plan (BDCP) Draft EIR/EIS (DEIR/DEIS) use the best available science in analyzing project alternatives and their effects? That is, do the analyses use science that is good enough, and use it well enough, for a project that is so large, complex, expensive, long-lasting, and important?*

*We find that the DEIR/DEIS currently falls short of meeting this “good enough” scientific standard. In particular:*

- 1. Many of the impact assessments hinge on overly optimistic expectations about the feasibility, effectiveness, or timing of the proposed conservation actions, especially habitat restoration.*
- 2. The project is encumbered by uncertainties that are considered inconsistently and incompletely; modeling has not been used effectively to bracket a range of uncertainties or to*

*explore how uncertainties may propagate.*

*3. The potential effects of climate change and sea-level rise on the implementation and outcomes of BDCP actions are not adequately evaluated.*

*4. Insufficient attention is given to linkages and interactions among species, landscapes, and the proposed actions themselves.*

*5. The analyses largely neglect the influences of downstream effects on San Francisco Bay, levee failures, and environmental effects of increased water availability for agriculture and its environmental impacts in the San Joaquin Valley and downstream.*

*6. Details of how adaptive management will be implemented are left to a future management team without explicit prior consideration of (a) situations where adaptive management may be inappropriate or impossible to use, (b) contingency plans in case things do not work as planned, or (c) specific thresholds for action.*

*7. Available tools of risk assessment and decision support have not been used to assess the individual and combined risks associated with BDCP actions.*

*8. The presentation, despite clear writing and an abundance of information and analyses, makes it difficult to compare alternatives and evaluate the critical underlying assumptions.”*

Delta Independent Science Board, “Review of the Draft EIR/EIS and Draft BDCP,” Report to the Delta Stewardship Council and California Department of Fish and Wildlife, May 15 (2014).

Comments made to the Delta Stewardship Council by Dr. Alex Parker of the California Maritime Academy and a member of the independent science review panel of the BDCP’s Effects Analysis established at the request of the Department of Water Resources and the Bureau of Reclamation concerning the technical aspects of the plan were quoted in a June 3, 2014 posting on:

<http://mavensnotebook.com/2014/06/03/reviewing-the-science-of-the-bay-delta-conservation-plan/>. That posting stated:

*“Dr. Parker said he would just provide the highlights of their analysis and the major themes that emerged as a result of their review. ‘We are heartened to see that the Delta Independent Science Board review of the draft BDCP and the EIR/EIS echoed a lot of our concerns, and I think that probably highlights for folks the areas where attention needs to be paid.’*

*He said there were four themes that emerged for the panel: [two of which are quoted here:]*

- The first is a real disconnect between the assessments of scientific certainty or uncertainty that is reflected in the Effects Analysis chapter versus what is in technical appendices, he said. ‘This was a concern to us because we know that with a set of documents this vast, most people are going to read the Effects Analysis and not the technical appendices. There’s a real concern that the effects analysis doesn’t adequately address that level of uncertainty around virtually all of the conclusions that are made.’*
- The implementation of the BDCP and its effects are highly uncertain, so the way to address this is through adaptive management, he said. ‘It is part of the plan; however the Effects Analysis needs to really clearly articulate the uncertainty in order to have an effective adaptive management process and at present, that simply doesn’t exist within the main document.’”*

*“Another place where this [a lack of a whole ecosystem approach in the BDCP effects analysis] is clear to us is with respect to hydrodynamics modeling, Dr. Parker said. ‘Hydrodynamics is*

*basically the movement of water, and this is a master variable in the system,' he said. 'If we want to have any conversation about circulation patterns, temperatures, submerged aquatic vegetation, contaminants, nutrients – we need to have reasonable modeling of the hydrodynamic system, and because we don't know where the restoration opportunity areas are necessarily defined in all cases – these are places where major conservation and restoration activities will take place – they were limited in what they could model in terms of hydrodynamics. That wasn't adequately acknowledged throughout, and again, raises high level of uncertainty in the ultimate analysis.' He also noted there were some counterintuitive results from some of the hydrodynamic modeling that was done there, but there wasn't sufficient information to really understand where those results came from."*

Those conclusions concerning the lack of a reliable database and Delta flow information to develop a credible EIR/EIS for the BDCP for assessing the impacts of the diversion of Sacramento River water around or through the Delta, are in keeping with a number of the specific comments made by us independently above.

### **Comments on Chapter 25 – Public Health**

Page 25-1 line 3 states, *"This chapter focuses on issues related to human health and safety that could potentially be affected by implementation of the BDCP alternatives, particularly with respect to water quality, the potential to cause or worsen water borne illness, the potential to create habitat for vectors that may carry diseases; and to address potential health related concerns from additional electric transmission lines needed under most of the alternatives."*

Page 25-1 lines 20-22 states, *"This chapter does not duplicate the information provided in other sections of the EIR/EIS, but rather focuses the discussion on potential impacts on human health of implementing the BDCP action alternatives."* Our comments on those bioaccumulating constituents in Chapter 8 are also applicable to the same constituents covered in Chapter 25.

Page 25-4 lines 9-11 states, *"Please see Chapter 8, Water Quality, Section 8.1.3.13, Pesticides and Herbicides, for a detailed discussion on the prior use of legacy pesticides in the Plan Area."* As discussed in our comments on those sections of Chapter 8, the BDCP draft EIS EIR is deficient as it fails to adequately discuss the readily available compilation data of organochlorine pesticides and PCBs in Delta and Central Valley water and fish developed and discussed by Lee and Jones-Lee.

Page 25-6 presents information on some of the sources of mercury in the Delta watershed. In addition to those mentioned, another tributary source of mercury is the Putah Creek. The findings of Lee and Jones-Lee's study of the current situation regarding mercury in Putah Creek have been published as,

Lee, G. F., and Jones-Lee, A., "LEHR Superfund Stormwater Runoff and Putah Creek Mercury Issues," *Journal Remediation*, **19(2)**:123-134, Spring (2009).  
<http://www.gfredlee.com/SJR-Delta/LEHRrunoffHgRemediation.pdf>

Lee, G. F., and Jones-Lee, A., "Summary of Slides – Putah Creek Mercury Water Quality Issues," Report of G. Fred Lee & Associates, El Macero, CA, Presented to Delta Tributaries Mercury Council, December 2 (2008).

<http://www.gfredlee.com/SJR-Delta/PutahHgMineSummary.pdf>

Lee, G. F., and Jones-Lee, A., "Runoff of Mercury from UCD/DOE LEHR Superfund Site – Putah Creek Mercury Issues," PowerPoint Slides for Presentation to Delta Mercury Tributaries Council, Sacramento River Watershed Program [<http://www.sacriver.org/issues/mercury/dtmc/> ], December 2 (2008).  
<http://www.gfredlee.com/SJR-Delta/PutahHgMinesli.pdf>

As discussed in those papers and reports, soils along Putah Creek are polluted with mercury that accumulates in fish tissue. The source of that mercury is mercury mines in the creek's watershed. Before the Lake Berryessa dam was constructed, stormwater runoff from the Putah Creek watershed transported mercury from former mercury mines to the Putah Creek flood plain. It will be very difficult to remediate the mercury-polluted soils along Putah Creek, and thus difficult to reduce the Putah Creek as source of mercury for the Delta.

Page 25-7 section on PCBs makes reference to deVlaming (2008). More reliable sources of information on PCBs in Delta tributaries and Delta water and fish are those included in the reports:

Lee, G. F., and Jones-Lee, A., "Update of Organochlorine (OCI) 'Legacy' Pesticide and PCB Concentrations in Delta and Central Valley Fish," Report of G. Fred Lee & Associates, El Macero, CA, September 10 (2007).  
<http://gfredlee.com/SurfaceWQ/UpdateLegacyPestCVFish.pdf>

Lee, G. F., "Need for Funding to Support Studies to Control Excessive Bioaccumulation of Organochlorine 'Legacy' Pesticides, PCBs and Dioxins in Edible Fish in the Central Valley of California," Report of G. Fred Lee & Associates, El Macero, CA, July (2003).  
[http://www.gfredlee.com/Runoff/OCI\\_Support.pdf](http://www.gfredlee.com/Runoff/OCI_Support.pdf)

Lee, G.F, and Jones-Lee, A., "Developing TMDLs for Organochlorine Pesticides and PCBs," Presented at the American Chemical Society Environmental Chemistry Division national meeting in San Diego, California, April (2001).  
[http://www.gfredlee.com/Runoff/sandiego\\_030801.pdf](http://www.gfredlee.com/Runoff/sandiego_030801.pdf)

Lee, G. F. and Jones-Lee, A., "Excessive Bioaccumulation of Organochlorine Legacy Pesticides & PCBs in CA Central Valley Fish," PowerPoint Slides made available at US EPA National Fish Contaminant Forum, San Diego, CA, January (2004).  
<http://www.gfredlee.com/Runoff/OCI-slides-SanDiego.pdf>

Page 25-7 devoted to Legacy Pesticides failed to reference the reports of Lee's comprehensive review of legacy pesticides in Delta and Central Valley fish on behalf of the SWRCB and CVRWQCB; those reports were referenced in the comments above on draft EIR/EIS Chapter 8.

Page 25-8 lines 17-21 states, "*In March 2004, the U.S. Food and Drug Administration (FDA) issued recommendations for the consumption of fish or shellfish for women who might become pregnant, women who are pregnant or nursing, and young children (no other sensitive receptors were identified). While FDA states fish and shellfish are an important part of a healthy diet,*

*nearly all fish and shellfish contain trace amounts of mercury (U.S. Food and Drug Administration 2011). However, some species contain higher amounts of the toxicant, and thus it is not recommended that women who might become pregnant, women who are pregnant or nursing, or young children eat shark, swordfish, king mackerel, or tilefish. None of these species are commonly found in the Delta. Further, local advisories should be checked for the safety of locally caught fish and if these advisories are unavailable, the weekly consumption of fish or shellfish species should be limited.”* As discussed in US EPA guidance referenced below, it is highly inappropriate to compare Delta or other waterbody fish tissue concentration to FDA tissue limits for the purpose of assessing the health hazard associated with consuming those fish.

US EPA, “Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1 Fish Sampling and Analysis, Third Edition,” EPA 823-B-00-007, US EPA Office of Water, Washington, DC, November (2000).

USEPA\_2000\_Guidance\_Document\_volume2.pdf

As stated in the above-referenced US EPA guidance,  
*“EPA and FDA have agreed that the use of FDA Action Levels for the purpose of making local advisory determinations is inappropriate. In letters to all states, guidance documents, and annual conferences, this practice has been discouraged by EPA and FDA in favor of EPA’s risk-based approach to derive local fish consumption advisories.”*

*“FDA action levels and tolerances are indicators of chemical residue levels in fish and shellfish that should not be exceeded for the general population who consume fish and shellfish typically purchased in supermarkets or fish markets that sell products that are harvested from a wide geographic area, including imported fish and shellfish products. However, the underlying assumptions used in the FDA methodology were never intended to be protective of recreational, tribal, ethnic, and subsistence fishers who typically consume larger quantities of fish than the general population and often harvest the fish and shellfish they consume from the same local waterbodies repeatedly over many years.”*

The US EPA guidelines or the California Office of Environmental Health Hazard Assessment (OEHHA) fish consumption advisory values should be used to determine the potential public health hazards associated with consumption of contaminated fish.

Page 25-24 lines 33-34 states, *“The CWA sets water quality standards for all contaminants in surface waters. In California, such responsibility has been delegated to the State, which administers the CWA through the Porter-Cologne [Water Quality Control] Act (Water Code, Section 13000 et seq.).”* As discussed in reviews cited below, the Clean Water Act establishes the approach for establishing water quality criteria that can be developed into state water quality standards. Contrary to the BDCP’s statement quoted above, the CWA does not “set water quality standards for all contaminants.”

G. Fred Lee and Anne Jones-Lee Expertise and Experience in Water Quality Standards and NPDES Permits Development and Implementation into NPDES Permitted Discharges  
<http://www.gfredlee.com/exp/wqexp.htm>

Lee, G. F., and Jones-Lee, A., “Clean Water Act, Water Quality Criteria/Standards, TMDLs, and Weight-of-Evidence Approach for Regulating Water Quality,” Water Encyclopedia:

Water Law and Economics, Wiley, Hoboken, NJ, pp 598-604 (2005).  
<http://www.gfredlee.com/SurfaceWQ/WileyCleanWaterAct.pdf>

Page 25-36 lines 6-8 states, discussed in Chapter 8, Water Quality (Section 8.1.1.6), numerical water quality objectives and standards have been established to protect beneficial uses, and therefore represent concentrations or values that should not be exceeded. “That statement is not accurate in that water quality objectives and standards can be exceeded once every three years.

Page 25-36 Section 25.3.1.3 Constituents of Concern and Water Quality again describes the approach used for the draft BDCP EIR/EIS to identify the constituents of concern, that is limiting the constituents considered to those that have been found to be present in concentrations above a water quality object or other standard. As discussed in our comments on Chapter 8 above, this approach is not technically valid for identifying all the constituents that need to be considered in evaluating potential water quality and public health impacts of the proposed BDCP.

As discussed above in the overall assessment, there is insufficient valid information to reliably evaluate the impact of diverting Sacramento River around or through the Delta on water quality/beneficial uses of the Delta.

## Appendix A

The following professional papers, reports, and presentations provide examples of Drs. Lee and Jones-Lee's experience in reviewing Delta water quality issues.

Lee, G. F., "New & Updated Presentations/Publications on Delta and SJR Water Quality Issues," Comments to J. Grindstaff, Director CALFED, Sacramento, CA, G. Fred Lee & Associates, El Macero, CA, October 2 (2007).

<http://www.gfredlee.com/SJR-Delta/PubsPresentsDeltaSJR.pdf>

Lee, G. F., and Jones-Lee, A., "Delta Nutrient-Related Water Quality Problems," PowerPoint Slides Presented at CALFED Science Conference, Sacramento, CA, October 24 (2008).

[http://www.gfredlee.com/SJR-Delta/CALFED\\_SciConf10-08.pdf](http://www.gfredlee.com/SJR-Delta/CALFED_SciConf10-08.pdf)

Lee, G. F., and Jones-Lee, A., "San Joaquin River Water Quality Issues," (PowerPoint Slides) Invited Paper Presented at Great Valley Conference, "At the Tipping Point," Sacramento, CA, Sponsored by Great Valley Center, Modesto, CA, May 11 (2006).

<http://www.gfredlee.com/SJR-Delta/SJR-April2006.pdf>

Lee, G. F., Jones-Lee, A., "San Joaquin River Water Quality Issues," Report of G. Fred Lee & Associates, El Macero, CA, June (2006).

<http://www.gfredlee.com/SJR-Delta/sjr-WQIssues.pdf>

In recent years the State Water Resources Control Board (SWRCB) and CA Department of Fish and Game have conducted reviews of the impact of altering Delta flows into and through Delta channels on impacting Delta aquatic life resources. Drs. Lee and Jones-Lee have been asked to prepare comments on these issues. This has led to development of several reports and professional presentations on these issues including:

Lee, G. F., and Jones-Lee, A., "Comments on Delta Stewardship Council Staff May 14, 2012 Draft of the Delta Plan," Comments to Delta Stewardship Council by G. Fred Lee & Associates, El Macero, CA, June 13 (2012).

<http://www.gfredlee.com/SJR-Delta/DSC-Comments-May2012-StaffDraft.pdf>

Lee, G. F., and Jones-Lee, A., "Comments on the DSC Staff Fifth Draft of Chapter 6 Devoted to Delta Water Quality Issues in the Delta Plan," Comments Submitted to Delta Stewardship Council, Sacramento, CA, by G. Fred Lee & Associates, El Macero, CA, August 21 (2011).

<http://www.gfredlee.com/SJR-Delta/DeltaPlan5DraftCh6Comm.pdf>

Lee, G. F., and Jones-Lee, A., "Comments on Revised Delta Plan Staff Draft Chapter 6 'Improve Water Quality to Protect Human Health and the Environment' as Presented in the Fourth Staff Draft of the Delta Plan," Comments Submitted to Delta Stewardship Council, Sacramento, CA, by G. Fred Lee & Associates, El Macero, CA, June 14 (2011).

<http://www.gfredlee.com/SJR-Delta/DeltaPlan4DraftCh6Comm.pdf>

Lee, G. F., and Jones-Lee, A., "Discussion of Water Quality Issues That Should Be Considered in Evaluating the Potential Impact of Delta Water Diversions/Manipulations on Chemical Pollutants on Aquatic Life Resources of the Delta," Report of G. Fred Lee & Associates, El

Macero, CA, February 11 (2010).  
[http://www.gfredlee.com/SJR-Delta/Impact\\_Diversions.pdf](http://www.gfredlee.com/SJR-Delta/Impact_Diversions.pdf)

Lee, G. F., and Jones-Lee, A., “Comments on Water Quality Issues Associated with SWRCB’s Developing Flow Criteria for Protection of the Public Trust Aquatic Life Resources of the Delta,” Submitted to CA State Water Resources Control Board as part of Public Trust Delta Flow Criteria Development, by G. Fred Lee & Associates, El Macero, CA, February 11 (2010).  
[http://www.gfredlee.com/SJR-Delta/Public\\_Trust\\_WQ.pdf](http://www.gfredlee.com/SJR-Delta/Public_Trust_WQ.pdf)

Lee, G. F., and Jones-Lee, A., “Review of Need for Modeling of the Impact of Altered Flow through and around the Sacramento San Joaquin Delta on Delta Water Quality Issues,” and “Summary: Water Quality Modeling Associated with Altered Sacramento River Flows in & around the Delta,” Report to CWEMF Stormwater Committee, by G. Fred Lee & Associates, El Macero, CA, March (2009). <http://www.gfredlee.com/SJR-Delta/Model-Impact-Flow-Delta>.

Lee, G. F., and Jones-Lee, A., “Synopsis of CWEMF Delta Nutrient Water Quality Modeling Workshop – March 25, 2008, Sacramento, CA,” Report of G. Fred Lee & Associates, El Macero, CA, May 15 (2008). [http://www.gfredlee.com/SJR-Delta/CWEMF\\_WS\\_synopsis.pdf](http://www.gfredlee.com/SJR-Delta/CWEMF_WS_synopsis.pdf)

“Overview of Delta Nutrient Water Quality Problems: Nutrient Load – Water Quality Impact Modeling,” Agenda for Technical Workshop sponsored by California Water and Environmental Modeling Forum (CWEMF), Scheduled for March 25, 2008 in Sacramento, CA (2008).  
[http://www.gfredlee.com/SJR-Delta/CWEMF\\_Workshop\\_Agenda.pdf](http://www.gfredlee.com/SJR-Delta/CWEMF_Workshop_Agenda.pdf)

Drs. Lee and Jones-Lee have also submitted comments on Delta water quality issues to BDCP, Delta Stewardship Council, including:

Lee, G. F., “Comments on the CVRWQCB Review of Delta Water Quality Issues,” Comments submitted to K. Longley, Chair Central Valley Regional Water Quality Control Board, by G. Fred Lee & Associates, El Macero, CA, March (2008).  
<http://www.gfredlee.com/SJR-Delta/DeltaIssuesLongleyMarch08.pdf>

Lee, G. F., and Jones-Lee, A., “Comments on Strategy 3.5 of the ‘Volume 2: Delta Vision Strategic Plan - Fifth Staff Draft Version 5.5,’” Comments submitted to P. Isenberg, Chair, Delta Vision Blue Ribbon Task Force, Sacramento, CA. Report of G. Fred Lee & Associates, El Macero, CA, October 17 (2008).  
<http://www.gfredlee.com/SJR-Delta/DeltaVisionStaffDraft5.pdf>

Lee, G. F., and Jones-Lee, A., “Comments on September 19, 2008 Delta Vision Task Force Meeting Discussion of Nutrient-Related Water Quality Problems in the Delta,” Comments submitted to P. Isenberg, Chair, Delta Vision Blue Ribbon Task Force, Sacramento, CA. Report of G. Fred Lee & Associates, El Macero, CA, October 14 (2008).  
<http://www.gfredlee.com/SJR-Delta/DeltaVisionCom9-19-08.pdf>

Lee, G. F., and Jones-Lee, A., “Comments on the DSC Staff Fifth Draft of Chapter 6 Devoted to Delta Water Quality Issues in the Delta Plan,” Comments Submitted to Delta Stewardship Council, Sacramento, CA, by G. Fred Lee & Associates, El Macero, CA, August 21 (2011).



<http://www.gfredlee.com/SJR-Delta/DeltaPlan5DraftCh6Comm.pdf>

Lee, G. F., and Jones-Lee, A., "Comments on Revised Delta Plan Staff Draft Chapter 6 'Improve Water Quality to Protect Human Health and the Environment' as Presented in the Fourth Staff Draft of the Delta Plan," Comments Submitted to Delta Stewardship Council, Sacramento, CA, by G. Fred Lee & Associates, El Macero, CA, June 14 (2011).

<http://www.gfredlee.com/SJR-Delta/DeltaPlan4DraftCh6Comm.pdf>

As well as a number of other comments on Delta management issues that are on Drs. Lee and Jones-Lee's website.