Comments on the Water Quality Section of BDCP/California WaterFix RDEIR/SDEIS

G. Fred Lee, PhD, BCEES, F.ASCE Anne Jones-Lee, PhD
G. Fred Lee & Associates
El Macero, California
530 753-9630
www.gfredlee.com

October 28, 2015

The *"Public Review Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) - 508 Compliant"* is available for public review at:
http://baydeltaconservationplan.com/2015PublicReview/PublicReviewRDEIRSDEIS/PublicReviewRDEIRSDEIS_508.aspx

In response to the request for comments on the Water Quality Section of BDCP/California WaterFix RDEIR/RDEIS (*Appendix A – Revisions to the Draft EIR/EIS - Chapter 8 – Water Quality – 508*) [http://baydeltaconservationplan.com/RDEIRS508/Ap_A_Rev_DEIR-S/08_WQ-508.pdf] we wish to submit the following comments.

Summary of Findings
Overall, we find that the Department of Water Resources (DWR) and the Federal Bureau of Reclamation (USBR) RDEIR/SDEIS falls far-short of adequately discussing the potential impacts of the proposed "Tunnel Project" for diverting the Sacramento River around the Delta on water quality-related beneficial uses of the Delta.

This assessment is based on more than 40 years of investigation of Delta water quality issues, summarized below and 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

Our comments on the BDCP draft EIR/EIS cited below also outline our qualifications to assess the quality of the DWR/USBR RDEIR/SEIS. Those comments discuss the unreliability of the approach used in developing the BDCP draft EIR/EIS concerning water quality impacts. Since the evaluation of the so-called "WaterFix" described as Alternative 4A in the RDEIR/SEIS followed the same approach, it, too, inadequately evaluated potential, and readily anticipated water quality impacts of the proposed diversion of Sacramento River; it is grossly deficient for meeting a certifiable, creditable environment assessment of the impacts of the "WaterFix" tunnel diversion.

Lee, G. F., and Jones-Lee, A., "Comments on Bay Delta Conservation Plan (BDCP) Draft EIR/EIS Chapter 8 – Water Quality, Chapter 25 – Public Health, July 25, 2014," Comments 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). http://www.gfredlee.com/SJR-Delta/Comments_BDCP_draft EIR_EIS_July2014.pdf

We are incorporating many of our comments on deficiencies in the draft BDCP EIR/EIS by reference in these comments on the draft REIR/SEIS "WaterFix" report.

We have reviewed the Environmental Water Caucus Comments on Recirculated Draft EIR/Supplemental Draft EIS for Bay Delta Conservation Plan and Tunnels Project section devoted to "Clean Water Act Violations" beginning on page 46 and support the statements made in the EWC comments. Our comments on the significant deficiencies in the DWR/USBR WaterFix RDEIR/SEIS focus on issues not covered in the EWC water quality comments with particular reference to the impact of the diversion of Sacramento River water on Central Delta nutrient/phosphorus water quality.

Experience in EIS EIR Reviews. A significant part of our professional activity is devoted to review of environmental impact statements. We are typically asked to evaluate the adequacy of a draft EIR/EIS for reliably discussing the impacts of a proposed project on water quality of potentially affected areas, both in breadth and technical foundation. It is critical that full and technically reliable assessments are made in an EIR/EIS to enable it to withstand the scrutiny of court proceedings to which it may be subject.

We also have been involved in the development of certified EIRs and are therefore familiar with the development of a credible certifiable EIR/EIS. For example we were involved in assessing water quality impacts of making significant alterations to Cache Creek in the Central Valley that is polluted by mercury. Our report on this issue is,

Lee, G. F., "Water Quality," Chapter 4.6 of Yolo County's Supplemental Environmental Impact Report for the Cache Creek Resources Management Plan and Cache Creek Improvement Program, County of Yolo Planning and Public Works Department, Woodland, CA (2002).

Deficiencies in "WaterFix" draft REIR/SEIS

One of the most significant deficiencies in the BDCP EIR/EIS and the WaterFix tunnel diversion project is that it does not properly review the published studies on flow patterns in the Central Delta channels as they are impacted by the amount of Sacramento River that is drawn through the Delta channels by the DWR/USBR export Banks and Jones pumps in the southern Delta. As discussed in our reports on our website (www.gfredlee.com in the Joaquin River Delta section) the withdrawal of South Delta water by the DWR and USBR south Delta pumps greatly influences the flow path of the San Joaquin River and the Sacramento River through the Delta. It is our understanding that implementation of WaterFix is projected to result in the withdrawal of up to 45% of the water from the Delta via those South Delta diversion projects. As discussed in our project reports, at this time all the San Joaquin River and a substantial amount of Sacramento River are drawn into the Central Delta through Turner Cut and Columbia Cut; significant alteration of these sources not only impacts the Central Delta water quality but also adversely impacts the ability of salmon to find their homestream water for spawning upstream of the Delta. These issues are reviewed in,

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).
http://www.gfredlee.com/SJR-Delta/Salmon-NOAAcom.pdf

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

The failure of the DWR/USBR draft EIR/EISs to discuss the fact that tunnel diversion will deprive the Central Delta of several thousand cfs of Sacramento River water that currently dilutes the SJR flow entering the Central Delta at Turner and Columbia Cuts is a significant deficiency; the Central Delta is a key part of the Delta ecosystem for fish and other aquatic life. As we found in DeltaKeeper-supported cruises, the current flow pattern is such that the South Delta export pumps pull Sacramento River water into the Central Delta via those "Cuts" and thereby dilutes pollutants in the SJR. Our reports on these issues are on our website (in the SJR-Delta section at http://www.gfredlee.com/psjriv2.html). Since pollutants in the SJR and Sacramento River have a substantial impact on Central Delta water quality, the Draft EIR/EISs are fundamentally flawed in their review of the impact of the WaterFix tunnel project on Delta water quality. A summary of our writings on the impact of altering Delta flows are presented in,

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

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.pdf

Review of Delta Stewardship Council (DSC)'s Delta Independent Science Board (DISB) comments on Bay Delta Conservation Plan (BDCP) WaterFix Draft Recirculated EIR/SEIS

On September 30, 2015 the DSC DISB submitted comments to the DSC on the draft EIR/EIS (http://deltacouncil.ca.gov/docs/final-delta-isb-comments-partially-recirculated-draft-environmental-impact-reportsupplemental). The ISB comments were reviewed by the DSC on October 23, 2015 and accepted by the Council.

Those comments noted several "data gaps" and stated,

"Environmental impacts of California WaterFix need to be assessed more completely and clearly."

The DISB comments included a section "Water Quality (Chapter 8)" that summarized several

deficiencies in the WaterFix draft REIR/SEIS Water Quality discussion of the impacts of the Sacramento River Tunnel Diversion project. Comments included the following, referencing pages of Chapter 8:

"*8-75, line 6: The failure to consider dissolved P (DP) should be addressed; there is much greater uncertainty. The adherence of some P to sediment does not prevent considerable discharge of P as DP. Also on page 8-95 line 40, qualify predictions due to lack of consideration of DP.*"

We strongly support the DISB's comment that the draft WaterFix REIR/SEIS is significantly deficient in its failing to evaluate the importance of dissolved inorganic phosphorus as a key component in impacting Delta water quality, especially Central Delta phytoplankton-related water quality. As discussed in our comments to the DSC

Lee, G. F., and Jones-Lee, A., "Comments on the Adequacy of C. Dahm's Discussion of Delta Eutrophication Issues & Delta N/P Rations 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

"In his CWEMF nutrient modeling workshop presentation entitled, 'Impact of Sacramento River Input of Phosphorus to the Delta on Algal Growth in the Delta,' Dr. Erwin Van Nieuwenhuyse summarized his recent paper describing the response of average summer chlorophyll concentration in the Delta to an abrupt and sustained reduction in phosphorus discharge from the Sacramento County Regional Sanitation District wastewater treatment facility. His presentation provides important information on the impact of Sac Regional phosphorus discharge on Delta planktonic algae in the Delta, and is available at, http://www.cwemf.org/workshops/DeltaNutrientsWrkshp/VanNieuwenhuyse.pdf.

"As discussed in the van Nieuwenhuyse's workshop presentation and published paper, vanNieuwenhuyse, 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]

and in the Lee and Jones-Lee workshop presentation, backup information, and papers referenced in their presentations, it is well-established that reducing the phosphorus loads and in-waterbody concentrations effects reductions in the phytoplankton biomass in Delta waters. This occurs even in situations in which the available phosphorus concentrations in the waterbody remain surplus compared to growth-rate-limiting concentrations. The decrease in planktonic algae in the Delta associated with decreased phosphorus loads to the Delta is important information that must be discussed in a creditable discussion of the impact of nutrients on Delta water quality."

It is clear that the amount of dissolved phosphorus transported into the Central Delta by the Sacramento River has a significant impact on the phytoplankton population in the Central Delta. The proposed WaterFix project's diversion of Sacramento River water will impact the amount of

Sacramento River water that enters the Central Delta and thereby impact the phosphorus input to the Central Delta and the phytoplankton population in that area of the Delta. This issue should have been discussed in the draft REIS/SEIR.

DWR Response to Delta ISB draft comments on some of the deficiencies in the Delta WaterFix draft EIR/EIS

On September 16, 2015 DWR submitted the following statement (https://s3.amazonaws.com/californiawater/pdfs/63qnf_Delta_ISB_draft_statement_-_Enos_-_FINAL.pdf):

> *"Statement from Cassandra Enos-Nobriga, program manager for the California Department of Water Resources, about the Delta Independent Science Board comments on the Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) for California WaterFix:*

At a recent DSC meeting Phil Isenberg, Vice-Chair of the Delta Stewardship Council, stated that he was disappointed in the DWR WaterFix REIR/SEIS response to the ISB comments. We strongly support his position. By her statement, Cassandra Enos-Nobriga, program manager for the California Department of Water Resources WaterFix, attempted to justify the grossly superficial review of the Delta ISB review of the draft EIR/EIS. Basically her response to the DISB comments repeatedly stated that the proposed Delta Tunnel WaterFix project REIS/SEIR is not required to provide a detailed comprehensive review of the potential impacts of the proposed project on Delta water quality and other Delta resource issues. This reflects a highly superficial approach taken by DWR for informing decision-makers and the public about potential impacts of the WaterFix tunnel diversion project. Based on our experience in reviewing draft EIR/EISs, that superficiality will make the draft EIS/EIR non-certifiable under judicial review.

Additional, Specific Comments on the "Public Review Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) - 508 Compliant"

Page 1-11 of http://baydeltaconservationplan.com/RDEIRS508/1_Introduction-508.pdf presents a summary of the approach used to evaluate the impact of the proposed WaterFix Tunnel project on Delta Water Quality. That section states,

> *"Delta Hydrology and Water Quality Generally, Delta hydrodynamics are defined by complex interactions between tributary inflows, tides, in-Delta diversions, and SWP and CVP operations, including conveyance, pumping plants, and operations of channel barriers and gates. The degree to which each variable impacts the overall hydrology of the Delta varies daily, seasonally, and from year to year, depending on the magnitude of inflows, the tidal cycle, and the extent of pumping occurring at the SWP and CVP pumping plants. Changes in water inflow and outflow throughout the Delta affect the water quality within the Delta, particularly with regard to salinity. It has been estimated that seawater is pushing 3 to 15 mile farther inland since development began in the Delta over 150 years ago (Contra Costa Water District 35 6 2010). Additionally, other water constituents of concern in the Delta have been identified through ongoing regulatory, monitoring, and environmental planning processes such as CALFED, planning functions of the State Water Board, and the CWA Section 303(d) list of state water bodies that do not meet applicable water quality standards. In June 2007 (with updates in February and May 2009), EPA gave final approval of a list of*

18 chemical constituents identified in the Section 303(d) list for impaired Delta waters (State Water Resources Control Board 2007). Included in this list are dichlorodiphenyltrichloroethane (DDT) and other pesticides, mercury, polychlorinated biphenyls (PCBs), and selenium."

Page 1-31 section 1.3.1 Substantive Draft EIR/EIS Revisions

"Section 2.2, Water Quality Revisions, describes additional analyses undertaken to more accurately characterize the potential for exceedances of water quality standards and summarizes associated revisions."

Those familiar with Delta water quality know that the approach that was used in DWR/USBR BDCP and WaterFix EIR/EIS and their revisions know that the approach of relying on exceedance of water quality standards (objectives) in the Delta at current water quality monitoring locations is a not reliable to assess current water quality in the Delta and certainly to evaluate the impact of altering the amount of Sacramento River that enters the Delta channels. The 305b list is limited compared to that needed to properly list the constituents and areas of the Delta that are experiencing impaired water quality. Basically the current water quality monitoring program for Delta waters is grossly deficient compared to that needed to adequately evaluate current water quality standard violations. There have been several attempts to significantly improve the current water quality monitoring program for in Delta waters. This deficiency has been recognized for many years,

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

Lee, G. F., and Jones-Lee, A., "Delta Water Quality Standards Violations" and "Comments on Water Quality Sections of the Delta Vision Strategic Plan, Third Staff Draft – dated August 14, 2008," Submitted to Delta Vision Blue Ribbon Task Force, Sacramento, CA. Report of G. Fred Lee & Associates, El Macero, CA, September 1 (2008). http://www.gfredlee.com/SJR-Delta/DeltaVisionWQViolations.pdf

These reports present a review of Delta water quality issues as well as the need for a more comprehensive water quality monitoring program in the Delta channels.

In order to begin to eliminate the deficiencies in the Delta water quality assessment the Central Valley Reginal Water Quality Board (CVRWQB) has initiated a program to develop a comprehensive water monitoring program. This program is presented in http://www.swrcb.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/

The major problem in developing this improved monitoring program is its funding. It is still

unclear that adequate funding can be developed to carry out the needed program. Several years of a comprehensive Delta channel water quality monitoring will be needed before adequate information will be available to develop a EIR/EIS that can be developed to inform the decision makers and the public of the potential impact of the proposed WaterFix tunnel project.

The WaterFix RDEIR/SDEIS Water Quality section 8.1.3.10 addressing Nitrate/Nitrite and Phosphorus states on page 8-23:

"In addition, changes in ratios of nutrients may affect aquatic life by causing changes in the proportions of algal species, macrophytes and higher species (Glibert et al. 2011). While the impact of nutrient ratios on the proportions of algal species, macrophytes and higher species is unsettled within the scientific community, some analyses demonstrate that the ratio of one nutrient to another, nutrient stoichiometry, may influence primary productivity and community composition. Glibert et al. (2011) analyzed over 30 years of Delta water quality data and conclude that numerous aquatic organism population shifts were correlated with changes in the quality and quantity of nutrients.

This relationship between nutrient ratios and organism population shifts is not unique to the Delta. Studies in Hong Kong, Tunisia, Germany, Florida, Spain, Korea, Japan and Washington D.C. (Chesapeake Bay), to name a few, have all concluded that nutrient stoichiometry influences phytoplankton community composition (Ruhl and Rybicki 2010; Ibanez et al. 2008; Hodgkiss and Ho 1997; and Glibert et al. 2004). Furthermore, studies by Glibert et al. (2004; 2006), Lomas and Glibert (1999, and Dortch (1990) concluded that diatoms have a preference for nitrate while dinoflagellates and cyanobacteria generally prefer more reduced forms of nitrogen. Hessen (1997) found that a shift from calanoid copepods to Daphnia tracked N-P changes in Norwegian lakes. Sterner and Elser (2002) found that zooplankton size, composition and growth rates changed as the N-P ratio changed. Similar changes have been observed in the Delta, though these researchers did not differentiate the form of N between nitrate and ammonium. Glibert et al. (2011) found significant correlations between nutrient ratios and the dominant zooplankton in the Delta over the last 30 years.

The beneficial uses most directly affected by nitrogen and phosphorus concentrations are aquatic organisms (cold freshwater habitat, warm freshwater habitat, and estuarine habitat), drinking water supplies (municipal and domestic supply), and recreational activities (water contact recreation, non-contact water recreation), which can be indirectly affected by the nuisance eutrophication effects of nutrients."

That discussion ignores the USGS and other reports of the unreliability of the Glibert nutrient ratios discussion. We discussed this issue in our comments:

Lee, G. F., and Jones-Lee, A., "Comments on the Adequacy of C. Dahm's Discussion of Delta Eutrophication Issues & Delta N/P Rations 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

An excerpt from those comments, equally applicable to the RDEIR/SEIS, is quoted below.

"In our comments on the third draft of the DSC Plan,

Lee, G. F., and Jones-Lee, A., "Comments on the Delta Stewardship Council's Third Staff Draft Delta Plan – Chapter 6 Improve Water Quality to Protect Human Health and the Environment – Released April 22, 2011," Submitted to Delta Stewardship Council, Sacramento, CA, Report of G. Fred Lee & Associates, El Macero, CA, Updated May 1 (2011). http://www.gfredlee.com/SJR-Delta/DSCThrdStaffDraft-Com.pdf

we reported the following:

"Impact of N/P Ratios on Delta Aquatic Life Resources The DSC third staff draft Chapter 6 devotes considerable attention to the writings that discuss N/P ratios in the Delta as a cause of ecosystem changes, the pelagic organism decline (POD), and of other resource problems in the Delta. The third staff draft Chapter 6 fails to mention a number of technical issues related to that concern that are discussed in the literature. For example, in his presentation cited below, Cloern discussed the lack of technical validity in the Glibert's claim that changes in N/P ratio are a cause of changes in the Delta ecosystem that has occurred in recent years.

Cloern, James "Historical Perspective on Human Disturbance in the Sacramento-San Joaquin Delta Ecosystem", Senior Research Scientist, U.S. Geological Survey Menlo Park, CA presented at National Academies of Science (NAS) National Research Council (NRC) meeting, "Sustainable Water and Environmental Management in the California Bay-Delta" held on July 13-15, 2010 in Sacramento, Ca, PowerPoint slides obtained from the NRC Public Access Records Office at www.nrc.gov/reading-rm/foia/foia-privacy.html.

In his CWEMF nutrient workshop presentation entitled, "Impact of Sacramento River Input of Phosphorus to the Delta on Algal Growth in the Delta," Dr. Erwin Van Nieuwenhuyse summarized his recent paper describing the response of average summer chlorophyll concentration in the Delta to an abrupt and sustained reduction in phosphorus discharge from the Sacramento County Regional Sanitation District wastewater treatment facility. His presentation provides important information on the impact of Sac Regional phosphorus discharge on Delta planktonic algae in the Delta, and is available at, http://www.cwemf.org/workshops/DeltaNutrientsWrkshp/VanNieuwenhuyse.pdf."

The WaterFix Tunnel RDEIR/SEIS discussion of the impact of N/P rations is unreliable reporting of the pertinent literature on this issue. The failure to discuss the findings of the USGS and other well-recognized Delta scientists results in unjustified bias in the discussion of the N/P ratio issues. This represents a significant deficiency in the RDEIR/SEIS.

We have focused our comments on deficiencies in the proposed WaterFix Tunnel project RDEIR/SEIS on water quality issues in the Central Delta as impacted by diversion of Sacramento River water. These comments are not exhaustive but rather serve to provide an example of the kinds of deficiencies that exist in the document. If the WaterFix Tunnel project were to proceed, there would be need to redo the EIR/EIS by an agency that would provide unbiased, technically valid, comprehensive review of the technical issues.

Questions or comments on these comments should be directed to G. Fred Lee at gfredlee33@gmail.com.