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Phil Isenberg, Chair
Delta Vision Blue Ribbon Task Force

Members of the Delta Vision Blue Ribbon Task Force:

Prompted by questions raised at the Task Force meeting on August 21-22, 2008, I am attaching information concerning existing violations of water quality standards in the Delta. As discussed, there are many well-known violations of water quality standards in the Delta. There are also a number of significant water quality impairments in the Delta which, while not now listed as violations of water quality standards, could become violations in the future.

As discussed in our reports referenced in these comments, the location, magnitude, and duration of water quality standards violations and water quality impairments in the Delta are influenced by manipulations of water flow through diversions/exports within and from the Delta and its tributaries.

Included herein also are comments on technical problems and deficiencies in the third staff draft of the Delta Vision Implementation Plan, specifically Strategies 5 and 8 devoted to water quality issues.

Please contact me if there are questions on these issues, or if we can be of assistance in developing a Delta Vision Implementation Plan that adequately addresses water quality management issues.

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Delta Water Quality Standards Violations

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At the August 21-22, 2008 Delta Vision Task Force public meeting, the Task Force and its advisors were specifically asked for information on what violations of water quality standards are occurring in the Delta. The response and discussion that ensued highlighted the notable inattention to the breadth of water quality issues and problems that are faced in the waters of the Delta and its major tributaries. While standard X2 and salinity violations were noted, a lack of awareness was exhibited of the broad range of water quality standards violations that are occurring, or threaten to occur, in the Delta and its tributaries. In an effort to elevate the comprehension of those issues, we offer this review of existing discussions of water quality standards violations that are known to be occurring in the Delta. Included herein as Table 1 is the most current listing of US EPA Clean Water Act (CWA) 303(d) "Impaired" Delta Waterbodies. Table 2 provides a listing of Delta waters that are impaired but not included in the most recent CWA 303(d) list. Also, comments are presented on the third staff draft of the Delta Vision Implementation Plan Strategies 5 and 8 devoted to water quality issues.

Out of our professional practice and particular interest in Delta water quality issues, we have followed the Delta Vision Blue Ribbon Task Force's development of the Delta Vision management strategy and the current efforts to develop an Implement Plan for that Vision. When we became involved in Delta water quality issues in the summer of 1989, Dr. Lee held the position of Distinguished Professor of Civil and Environmental Engineering at the New Jersey Institute of Technology (NJIT) and Dr. Jones-Lee held the position of Associate Professor of Civil and Environmental Engineering at NJIT. We were hired as consultants to review water quality issues that could be expected to develop if Delta waters were held in in-Delta island water storage reservoirs. As part of that investigation, we reviewed the existing data on water quality characteristics of the Delta and its watershed. We have continued to follow water quality issues pertaining to the Delta and its tributaries since moving to the area in late 1989. A discussion of these activities is provided on our website, www.gfredlee.com, at <http://www.members.aol.com/annejlee/Delta-SJR-exp.pdf>.

Dr. Lee's professional expertise and experience span nearly five decades as he has held professorial positions focusing on science and engineering aspects of chemical contaminants in the environment at major universities; in his hands-on experience in private consulting for governmental agencies, industries, and others; and in his public service. Much of his career has focused on the development of water quality criteria and standards, and their implementation into regulatory programs. This experience has included serving as an invited peer reviewer for the National Academies of Science and Engineering "Blue Book" "Water Quality Criteria of 1972," and as a US EPA-invited peer reviewer for the criteria development approach incorporated in its "Yellow Book" of water quality criteria in the mid-1980s. That criteria development approach is

still in use today. A summary of our work in the development, evaluation, and use of water quality criteria and standards is available on our website at <http://www.gfredlee.com/exp/wqexp.htm>.

Between 1999 and 2004 we were selected by the SJR DWSC DO TMDL Steering Committee and CALFED to serve as coordinating principal investors for a CALFED-supported \$2-million, several-year contract devoted to investigating the San Joaquin River (SJR) Deep Water Ship Channel (DWSC) low dissolved oxygen (low-DO) problem. We developed synthesis reports of the data/results of those studies as,

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 and CALFED Bay-Delta Program, G. Fred Lee & Associates, El Macero, CA, March (2003). <http://www.gfredlee.com/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.members.aol.com/duklee2307/SynthRptSupp.pdf>

Lee, G. F. and Jones-Lee, A., "San Joaquin River Deep Water Ship Channel Low DO Problem and Its Control," PowerPoint slides presented at SETAC World Congress Portland, OR, November 2004. Updated December (2004). <http://www.members.aol.com/GFLEnviroQual/LowDOSummaryDec2004.pdf>

Our synthesis reports and supplements, as well as our other papers and reports pertaining to the Delta are posted on our website in the SJR Watershed Delta section at <http://www.gfredlee.com/psjriv2.htm>. Those materials provide detailed information on the low-DO problem in the SJR DWSC and potential approaches for controlling that problem. Our work on the SJR DWSC low-DO issues has greatly expanded the base of understanding of water quality in the South and Central Delta and the San Joaquin River, and the factors impacting the water quality in those waterbodies.

Following the completion of the synthesis reports, we continued to investigate water quality issues with support and assistance from William Jennings, then DeltaKeeper, and self-support. We developed the first comprehensive report of Delta water quality issues, in a series of drafts that were distributed to about 100 individuals knowledgeable in Delta water quality issues for comment. The final report is available as,

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, June (2004). <http://www.members.aol.com/apple27298/Delta-WQ-IssuesRpt.pdf>

We presented an invited, updated summary of our findings on Delta water quality issues at the CA/NV American Water Works Association (AWWA) Fall Conference, in Sacramento, in October 2007. That update is available as:

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.members.aol.com/GFLEnviroQual/DeltaWQCANVAWVAOct07.pdf>

That 2007 overview contains information on the 2006/2007 CVRWQCB/SWRCB and US EPA's listing of the Clean Water Act 303(d) "impaired" Delta waterbodies in which violations of water standards were found. Tables 1 and 2 below are summaries, from our presentation, of existing water quality standards violations and potential water quality standards violations based on our evaluation of impaired waterbodies.

The 2004 report and 2007 update also discussed water quality conditions in the Delta channels that, based on our expertise and experience, could cause them to be considered "impaired," and 303(d)-listed if water quality standards existed for certain other parameters. For example, aquatic plant nutrients (nitrogen and phosphorus compounds) are supporting excessive growths of algae and aquatic weeds that are causing significant deterioration of Delta water quality. However, those parameters are not listed by the CVRWQCB/ SWRCB and the US EPA as 303(d)-included parameters even though those water quality problems are well known; there are no numeric water quality standards for nitrogen and phosphorus compounds as aquatic plant nutrients. These issues are discussed in our Delta Nutrient Water Quality Modeling Workshop summary,

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.members.aol.com/GFLEnviroQual/CWEMF_WS_synopsis.pdf

In our 2004 Delta Water Quality report (Lee and Jones-Lee, 2004 cited above) we discussed the fact that water diversion from the Delta affects the location, magnitude, and water quality impacts of violations of water quality standards. As pointed out, there is essentially no information on those issues or on how alterations in the pumping of Delta water for export impact the existing or anticipated future violations of water quality standards. Our report also discussed the significant inadequacies in the monitoring of Delta water quality for definition of the current water quality problems and the sources of constituents responsible for those problems.

In the spring of 2006 we were asked to present a paper discussing the water quality standards violations that are known in the San Joaquin River, at the Great Valley Conference on the San Joaquin River in Modesto. The paper and PowerPoint slides for that presentation are available on our website as noted below.

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.members.aol.com/annejlee/SJR-April2006.pdf>

Lee, G. F. and Jones-Lee, A., "San Joaquin River Water Quality Issues," Report of G. Fred Lee & Associates, El Macero, CA, June (2006).
<http://www.members.aol.com/annejlee/sjr-WQIssues.pdf>

In the fall of 2007 we updated that information for presentation at the Central Coast Agricultural Water Quality Coalition conference in Monterey:

Lee, G. F., and Jones-Lee, A., "Water Quality Issues of Irrigated Agricultural Runoff/Discharges—San Joaquin River, Central Valley, California," Presented at *Agriculture and the Environment - 2007 Conference*, Central Coast Agricultural Water Quality Coalition, Monterey, CA, November (2007).

<http://www.members.aol.com/GFLEnviroQual/SJR-WQ-Ag-Monterey.pdf>

In conclusion, when someone asks what water quality standards violations are occurring in the Delta, he/she should be referred to Table 1, attached, and our reports. The Delta Vision implementation plan that is being developed by the Delta Vision Blue Ribbon Task Force should include a framework for addressing the full range of known water quality standards violations as well the other water quality impairments (for example, see Tables 2).

Specific comments on the water quality sections, Strategies 5 and 8, of the third staff draft of the Delta Vision implementation plan are attached.

If there are questions on these comments, or if we can be of assistance in formulating a discussion of existing water quality problems in the Delta that need to be addressed as part of the Delta Vision Implementation Plan, please contact us.

G. Fred Lee and Anne Jones-Lee

Table 1
2006 CWA 303(d) List of "Impaired" Delta Waterbodies (SWRCB, June 2007)

Pollutant*/Stressor	Location (see key below)														Potential Sources (see key below)				
	CD	ED	SE	ND	NW	SD	SC	WD	SJ	MS	OR	MR	MDR	Ag	R/S	SU	AM	Other	
Chlorpyrifos	X	X	X	X	X	X	X	X						X	X				
Diazinon	X	X	X	X	X	X	X	X						X	X				
DDT	X	X	X	X	X	X	X	X	X					X					
Group A Pesticides (legacy)	X	X	X	X	X	X	X	X	X					X				Formerly-used pesticides	
EC/TDS			X		X	X		X	X					X					
Exotic Species	X	X	X	X	X	X	X	X								X			
Mercury	X	X	X	X	X	X	X	X	X								X		
Unknown Toxicity	X	X	X	X	X	X	X	X	X					X		X			
Dioxin/Furan							X											Point source; McCormick/Baxter; Contaminated sediment	
Pathogens							X			X					X			Non-boating recreation; tourism	
PCBs				X			X						X			X		Point source	
Low DO							X								X			Hydromodification	
										X					X			WWTP ammonia	
Copper																	X		
Zinc																	X		
Boron									X					X					
Toxaphene									X							X	X		

Location Designations
CD - Central Delta
ED - Eastern Delta
SE - South Delta export area
ND - North Delta
NW - Northwestern Delta
SD - Southern Delta
SC - Stockton Ship Channel
WD - Western Delta
SJ - Lower San Joaquin River
MS - Mormon Slough
OR - Old River - South Delta
MR - Lower Mokelumne River
MDR - Middle River

Group A Pesticides	
aldrin	heptachlor epoxide
dieldrin	hexachlorocyclohexane
chlordane	(incl. lindane)
endrin	endosulfan
heptachlor	toxaphene

Pyrethroids
bifenthrin
lambda cyhalothrin
efenvalerate/fedvalerate
permethrin

Source Designations
Ag - Agriculture
R/S - Urban runoff/Storm sewers
SU - Source unknown
AM - Abandon mine
WWTP - Domestic wastewaters

CWA - Clean Water Act
 * Violates water quality objective

Table 2

Delta Impaired Waters Not Listed on CWA 303(d)

Should Be Listed	Known Impairments
Nutrients - N & P	Excessive growth of algae & macrophytes
TOC/DOC	Trihalomethanes formed in water treatment
Pyrethroid pesticides used in agriculture & urban areas	Watercolumn & sediment toxicity
Could Be Listed - Need Investigation for Potential Impacts	
	Sources
PBDE - polybrominated diphenylethers	Domestic wastewater discharges
PPCP - pharmaceutical & personal care products	Domestic wastewater discharges
Pharmaceuticals & hormones	Dairy & animal husbandry operations
Other unregulated chemicals	Various

Comments on Water Quality Sections of the Delta Vision Strategic Plan, Third Staff Draft – dated August 14, 2008

Comments Prepared by G. Fred Lee & Anne Jones-Lee
September 1, 2008

The draft Plan identifies two “strategies” to achieve desired results for the Delta that address water quality issues and the implementation of the Delta Vision Plan to achieve those results: “Strategy 5. Improve water quality for drinking water, agriculture, and the ecosystem and Strategy 8. Reduce or eliminate ecosystem stressors to below critical threshold.”

Table 2 that begins on page 25 proposes “performance measures” for the water quality strategies associated with various “desired results,” “strategies,” and “indicators.” In that table (page 26) associated with the indicator – “Water Supply Reliability,” desired results – “improved water quality,” “strategy 5,” the following “Performance Measures and Preferred Direction of Change (+ or -)” are listed:

- *“Percentage of time that ambient levels of 3 mg/L TOC and 50 ug/L bromide are achieved at drinking water intakes (or other applicable standards, whichever are more stringent) (+)*
- *Percentage of agricultural water supplies meeting or exceeding current quality standards (+)*
- *Net levels of salinity in major groundwater aquifers (-)*
- *Percentage of time that pathogen concentrations at Delta intakes meet the Bin 1 requirements of the Long Term 2*
- *Enhanced Surface Water Treatment Rule (+)*
- *Number of nuisance growths of algae or aquatic plants in the Delta or water project facilities (-)*
- *Concentrations of contaminants in urban runoff flowing into the Delta (-)”*

On page 27 in that table, associated with the indicator – “Functional Habitat,” topic – “Invasive Species, Algae, and Mercury,” desired results – “Elimination of invasive species and control of mercury contamination,” strategy 8, the following “Performance Measures” are listed:

- *Number of new, uncontrolled harmful invasive species (-)*
- *Percentage of 1995-2000 average abundance and distribution of invasive clams (Corbula and Corbicula) (-)*
- *Percentage of 1990-2000 average abundance and distribution of Brazilian waterweed (Egeria) (-)*
- *Concentration of methylized mercury in Delta water compared to 2008 baseline (-)*

The discussion of “Strategy 5. Improve water quality for drinking water, agriculture, and the ecosystem” (page 43) states,

“The State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards should immediately pursue a program of enhanced source control, focused on the Delta, including incentive based programs, new water quality objectives, current permits, appropriate conditional waivers, and effective enforcement.”

Overall, given these and other aspects, the third staff draft for implementation of the Delta Vision does not reflect the current state of understanding of water quality issues in the Delta and

their management. From the third staff draft, the Task Force and reviewers could be led to believe that the CVRWQCB has not developed water quality management programs to control pollutants that are impairing Delta water quality. On the contrary, and in accord with the requirements of the US EPA Clean Water Act (CWA), the CVRWQCB has formulated programs, which when implemented, would control many of the water quality problems in the Delta listed in our Tables 1 and 2 presented above. In accord with CWA section 303(d) requirements, many violations of water quality standards have been defined and TMDLs have been called for to address those violations. Progress in that effort has been controlled by the funding of the CVRWQCB to implement the requirements of the CWA. The inadequacy in funding of the CVRWQCB TMDL programs has greatly impeded the TMDL development to control water quality standards violations, and efforts to further define other constituents that are impairing Delta water quality.

Another significant cause of the current inadequacies in water quality management in the Delta was the failure of the CALFED Ecosystem Program and the CALFED Science Program to provide adequate attention to, and funding of research for, addressing aquatic life-related water quality impairments in the Delta.

The most important outcome of the Delta Vision Blue Ribbon Task Force for addressing water quality problems in the Delta would be to establish a well-defined and sufficient level of funding for the CVRWQCB to implement the federal CWA requirements for controlling violations of water quality standards, and to support the studies needed to develop programs that effectively address other water quality impairments in the Delta.

While the current Pelagic Organism Decline (POD) program has increased the funding to work on some aspects of aquatic-life-related water quality issues in the Delta, the level of funding falls far-short of that needed to adequately develop the information needed for the POD program, much less address the many other aquatic-life-related water quality problems in the Delta.

The third staff draft lists as a “Performance Measure” for strategy 5 the need to control TOC and bromide for domestic water supplies. However, no performance measures are listed for aquatic-life-related water quality issues. This is indicative of the longstanding imbalance in focus between domestic water supply water quality issues and well-known aquatic-life-related water quality problems in the Delta. A performance measure should be added to fund the implementation of TMDLs to control violations of water quality standards that adversely affect aquatic-life-related water quality.

The Strategy 5 “Performance Measures” include: “*Net levels of salinity in major groundwater aquifers (-).*” As individuals familiar with Central Valley groundwater quality issues (see Lee, G. F. and Jones-Lee, A., “Groundwater Quality Protection Issues,” Report of G. Fred Lee & Associates, El Macero, CA, February (2007). <http://www.members.aol.com/annelhome/GWProtectionIssues.pdf>)

Lee, G. F., and Jones-Lee, A., “Groundwater Quality Protection Issues,” Presented in part at CA/NV AWWA Fall Conference, Sacramento, CA, PowerPoint Slides, G. Fred Lee & Associates, El Macero, CA, October (2007). <http://www.members.aol.com/annejlee/GWProtectionIssues-sli.pdf>

we do not understand what this performance measure has to do with Delta water quality issues.

While there are significant groundwater salinity issues in the Central Valley, these are not Delta water quality issues. This performance measure should be deleted from Strategy 5 or more fully discussed to provide information on how this performance measure is important to Delta water quality.

Strategy 5 also includes the Performance Measure: “*Concentrations of contaminants in urban runoff flowing into the Delta (-)*.” Dr. Lee has been involved in investigating the water quality characteristics of urban stormwater runoff since the mid-1960s when he conducted some of the first studies of characteristics and water quality impacts of urban stormwater runoff. We have been involved in extensive research on urban stormwater runoff water quality specifically in California over the past 15 years. Many of our publications on these issues are available on our website, www.gfredlee.com in the Surface Water Quality section, “Urban Stormwater Runoff” subsection located at <http://www.gfredlee.com/pswqual2.htm#runoff>.

In addition, over the past 11 years we have published the “Stormwater Runoff Water Quality Newsletter” that is distributed at no cost at about monthly intervals via email to approximately 9,900 subscribers. (Free subscription is available by contacting gfredlee@aol.com, and past issues of the Newsletter and a topic index are available at, <http://www.gfredlee.com/newsindex.htm>.) Volume 10 no.10/11 of that Newsletter (<http://www.members.aol.com/LFandWQ/swnews101011.pdf>) included information on Delta water quality issues.

We also developed the following discussion regarding developing water quality management programs for pollutants in urban stormwater runoff:

Lee, G. F., and Jones-Lee, A., "Regulating Water Quality Impacts of Urban and Highway Stormwater Runoff," Report of G. Fred Lee & Associates, El Macero, CA, July 3 (2008). <http://www.members.aol.com/GFLEnviroQual/RegulateStormwater.pdf>

That report was selected by the editor of the Journal Stormwater as a feature article in its July 2008 issue (<http://www.stormh2o.com/web-articles/urban-highway-runoff.aspx>). That article discusses many of the issues that need to be addressed to begin to cost-effectively manage water quality impacts of chemicals and pathogen-indicator organisms in urban stormwater runoff.

Based on our experience and expertise in urban stormwater runoff water quality and Delta water quality issues, and in the impacts of chemical contaminants on water quality, we can see no justification for singling out “*Concentrations of contaminants in urban runoff flowing into the Delta*” as a performance measure without mentioning other sources of contaminants such as agricultural stormwater runoff and tailwater, and subsurface drain water discharges. Wastewater discharges from dairies and animal husbandry areas, as well as domestic wastewater discharges also need to be addressed as sources of potential pollutants that impact Delta water quality. The Strategy 5 write-up, especially the Performance Measures section, needs extensive rewriting to more properly reflect the range of water quality issues that exist in the Delta.

Page 44 lists the following “*Critical elements of controlling contaminants at the source*”:

- *“By 2012, the SWRCB and Central Valley Regional Water Quality Control Board (CVRWQCB) should develop water quality objectives for Central Valley rivers, tributaries, and the Delta for priority constituents (including nutrients, mercury, and selenium) that are fully protective of beneficial uses.*
- *By 2013, the CVRWQCB should complete source control elements of the Water Boards Bay-Delta Strategic Workplan, clear the backlog of expired permits, and conduct all necessary oversight.*
- *Annually through 2013 and as needed after that, the SWRCB, Department of Water Resources (DWR), U.S. Environmental Protection Agency (USEPA), and U.S. Department of Agriculture (USDA) should provide financial assistance (loans and grants) for local government and individuals to help achieve Delta water quality objectives.”*

The target dates of 2012 and 2013 for achieving these goals are unrealistic even with a massive influx of funding.

Work on developing mercury water quality standards should not be singled out as a high priority issue for attention. We been involved in mercury water quality issues since the mid-1980s when we were consultants to the American Dental Association on the water quality significance of waste dental amalgam discharged to municipal sanitary sewer systems by dental offices. We have followed the work on mercury sources and their control in the Central Valley and Delta through participation in the Delta Mercury Tributary Council. Over the past several years Dr. Lee has also been a member of the steering committee for the several-million-dollar, several-year, CALFED-supported Mercury Project. Through this experience we are familiar with the current state of knowledge on mercury issues in the Delta. The OEHHA has developed water quality objectives for mercury based on fish tissue concentrations that are considered acceptable for human consumption. The CVRWQCB has defined a relationship between the methylmercury concentration in Delta water and the bioaccumulation of mercury in edible tissue of fish. The CVRWQCB is implementing this information into a mercury control program for the Delta and its tributaries through a TMDL. The emphasis in the Task Force discussion of mercury should be on ensuring that the CALFED funding of the current Mercury Project is continued.

There are several other water quality parameters, however, that do need attention and should be mentioned. As discussed in our Delta Water Quality report, for example, there is need to conduct additional research for developing revised water quality standards for selenium in the Delta. However, based on our experience in developing water quality criteria and their implementation into water quality standards (see <http://www.gfredlee.com/exp/wqexp.htm>), revised water quality criteria for selenium cannot be developed and adopted by the regulatory agencies by 2012. The development of water quality criteria that can be implemented into reliable regulatory standards requires a substantial database beyond that which currently exists and will require several years of detailed study. Further, it typically takes several years of work to adopt water quality criteria once adequate data are available.

With respect to developing nutrient water quality standards for the Delta, Dr. Lee has been involved in evaluating and managing the water quality impacts of aquatic plant nutrients since the early 1960s. As summary of our experience in this area is available at,

<http://www.gfredlee.com/exfert.htm>. This experience has included the development of a world-wide, approximately 750-waterbody (lakes and reservoirs) database that quantitatively describes the relationship between normalized phosphorus load and planktonic algal chlorophyll concentrations. We organized the California Water and Environmental Modeling Forum one-day workshop devoted to nutrient water quality issues in the Delta that was held in Sacramento in March 2008. Information on that workshop is available at,

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.members.aol.com/GFLEnviroQual/CWEMF_WS_synopsis.pdf

Based on our experience working on nutrient water quality issues, it will not be possible to develop reliable water quality standards for nutrients in the Delta by 2012. Even with substantial funding this will take at least 10 years or more of concerted effort.

The staff's "Critical Elements" recommendation to have the agencies develop funding to support the recommended water quality standards and pollutant source control activities should be redirected to the California legislature. Several of these agencies have been trying for years to obtain funding to work on these issues. Until the California legislature provides the large amount of needed funding, little will be accomplished toward meaningfully addressing the broad range of water quality issues that exist in the Delta.

A key part of future studies should focus on defining and describing how Delta tributary flow diversions and in-Delta exports impact water quality in the Delta. As discussed in

Lee, G. F., "Comments on the CA State Water Resources Control Board Cease and Desist Order to Cause the US Bureau of Reclamation and CA Department of Water Resources to Control Salinity Violations in the South Delta Compliance Points," Testimony presented at CA SWRCB evidentiary hearing, Sacramento, CA, November 7 (2005). <http://www.members.aol.com/annejlee/CeaseDesistSalinity.pdf>

Lee, G., F., and Jones-Lee, A., "Need for Reliable Water Quality Monitoring/Evaluation of the Impact of SWRCB Water Rights Decisions on Water Quality in the Delta and Its Tributaries," Submitted to CA Water Resources Control Board Workshop on D-1641 Water Rights, Sacramento, CA, March 22 (2005).

<http://www.members.aol.com/annejlee/DeltaWaterExportImpactsPaper.pdf>

those who hold water rights that involve the diversion/export of Delta and Delta tributary waters should be required to fund studies to determine the impact of those diversions/exports on water quality. Adoption of this approach would provide the funds needed to better manage Delta water quality issues.

Overall, Strategy 5 needs extensive rewriting to more reliably present what is known about Delta water quality issues and approaches that should be developed to begin to address them. This rewrite needs to be developed by individuals who are familiar with and understand water quality issues in general and especially in the Delta.

Discussion of the third staff draft Strategy 8, “Reduce or eliminate ecosystem stressors to below critical thresholds,” begins on page 52.

“Critical elements” of this strategy include (page 53):

- “By 2012, the Central Valley Water Quality Control Board (CVWQCB) should develop and implement Total Maximum Daily Load (TMDL) programs for areas upstream of the Delta to reduce the loads of organic and inorganic mercury entering the Delta from tributary watersheds. The mercury TMDL program for the Delta itself should continue.”

As discussed above in review of the mercury issue in Strategy 5, the CVRWQCB has a well-developed program for formulating mercury control programs. The comments made above regarding mercury are applicable to this strategy as well.

Another “Critical Element” (page 53) given is:

- “Beginning immediately, the SWRCB, the CVRWQCB, and the USEPA should develop comprehensive strategies to reduce contaminant load discharges at all point and non-point sources. These load reductions should be achieved through multiple methods, including:
 - Improved treatment processes
 - Discharge avoidance through reduced water use, water reuse, and water recycling.
 - Ensuring that all point source discharges throughout the Central Valley watershed are in full compliance with existing regulatory requirements.
 - Use of treatment wetland systems for contaminant removal at agricultural municipal, and industrial point sources before discharge into Delta waters and all tributary rivers and streams is an effective approach in many circumstances.”

This recommendation could lead the Task Force and the readers of this Delta Vision Implementation Plan to believe that the CVRWQCB does not have water quality management programs in place to control violations of water quality standards. As discussed above, in accord with current regulatory requirements, the CVRWQCB has formulated regulatory programs for the CWA 303(d)-listed waterbodies. However the implementation of those programs has been severely limited by inadequate funding from the California legislature.

The strategy 8 recommendation to use “treatment wetlands” to treat wastewaters must be approached with caution and with the understanding that that approach has highly limited applicability and frequently leads to other water quality problems. While teaching and conducting research at the University of Wisconsin-Madison in the 1960s, Dr Lee had several graduate students conduct their MS theses and doctoral dissertations on water quality aspects of wetlands. A summary of those studies was published as:

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.members.aol.com/GFLEnviroQual/MarshesBentleyAmundson.pdf>

While wetlands can be effective in removing some types of pollutants if they are not hydraulically and pollutant-overloaded, they also contribute other pollutants in discharge waters especially under high-flow conditions. The city of Davis, California has recently had to abandon its domestic wastewater treatment wetlands due to their inability to achieve water

quality standards in the treatment wetlands discharge. Any use of treatment wetlands must include a careful evaluation of their potential benefits, as well as their limited ability to control many pollutants, the large amounts of land needed to develop effective wetlands, and the potential problems that such wetlands can create for water quality, vector control, etc., compared to other approaches. There is no justification for singling out treatment wetlands as a method that should receive a high priority for attention/funding in the Task Force Implementation Plan.

The “Performance Measures” listed in the third staff draft Table 2 for Strategy 8 repeat Performance Measures presented for Strategy 5, including

- “*Concentration of methylized mercury in Delta water compared to 2008 baseline (-)*”
and
- “*Concentrations of contaminants in urban runoff flowing into the Delta (-)*”

The comments made above regarding mercury and urban stormwater runoff water quality are applicable to these Performance Measures as well. Singling out those issues without mentioning the wide array of other well-known water quality problems in the Delta and its tributaries misrepresents the real water quality issues facing the Delta and provides inadequate and unreliable guidance to the Task Force, the legislature, other elected officials, and the readers of the Delta Vision Implementation Plan. Like Strategy 5, Strategy 8 needs to be redrafted to more adequately and reliably formulate a water quality management plan for the Delta.