Comments on the DSC Staff Fifth Draft of Chapter 6 Devoted to Delta Water Quality Issues in the Delta Plan Submitted by G. Fred Lee, PhD, PE, BCEE, F.ASCE and Anne Jones-Lee, PhD G. Fred Lee & Associates El Macero, California gfredlee@aol.com www.gfredlee.com

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Overall Comments

Chapter 6 in the fifth staff draft of the Delta Plan is significantly deficient in providing the Delta Stewardship Council (DSC) and the public with key information on Delta water quality issues that need attention as part of developing a final Delta Plan to manage Delta water quality and other resources. Several of the major issues discussed in our comments on the third and fourth drafts of Chapter 6 continued to be ignored in the fifth draft, including the disregard of key references to the published literature pertinent to impacts of nutrients on Delta water quality, impacts of water diversions on Delta water quality, PCBs as current bioaccumulatable chemicals in edible Delta fish, inadequacy in the discussion of N/P ratio issues, impairment of groundwater use by excessive salinity in Delta waters, among others. Without an adequate discussion of these issues in Chapter 6, the DSC council and the public will be deprived of important information needed to formulate a final Delta Plan.

Specific Comments

Page 133 lines 8 and 9 states, "Drinking water supply is regulated by the California Department of Public Health." The focus of the Department of Public Health's drinking water regulations is the water that is delivered to the users. The Central Valley Regional Water Quality Control Board (CVRWQCB) has the primary responsibility for regulating the water quality of drinking water supply waters.

Page 134 lines 10-13 – The list water quality constituents/concerns provided should include aquatic plants such as Egeria and hyacinth. The excessive growth of those aquatic plants is a much more significant cause of water quality impairment in the Delta than several of the parameters listed in this section.

Page 134 lines 22-26 mentions that various Basin Plans and SWRCB D-1641 "establish water quality objectives for which implementation is best achieved through assigning responsibilities to water-right holders and water users." While that statement is correct, it neglects to note that the SWRCB has failed to require that water diverters/users evaluate and manage the water quality impacts of those diversions. These issues were discussed in our comments on the deficiencies in the third draft of Chapter 6 cited below,

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 in the section **"Compliance with SWRCB D-1641"** (page 10) with references to additional information on this issue in the following sources:

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., "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

Lee, G. F., and Jones-Lee, A., "Impact of SJR & South Delta Flow Diversions on Water Quality," PowerPoint Slides, Presentation to CA Water Resources Control Board, D 1641 Water Rights Review, January 24 (2005). http://www.gfredlee.com/SJR-Delta/D1641SlidesSWRCBJan2005.pdf

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 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.gfredlee.com/SJR-Delta/DeltaWaterExportImpactsPaper.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 & Its Tributaries," PowerPoint Slides Submitted to CA Water Resources Control Board Workshop on D-1641 Water Rights, Sacramento, CA, March 22 (2005). http://www.gfredlee.com/SJR-Delta/DeltaWaterExportImpactsPowerPoint.pdf

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.gfredlee.com/SJR-Delta/CeaseDesistSalinity.pdf Lee, G. F., and Jones-Lee, A., "Water Quality Issues That Could Influence Aquatic Life Resources of the Delta," Comments submitted to CALFED Science Program, Sacramento, CA, by G. Fred Lee & Associates, El Macero, CA, November 28 (2005). http://www.gfredlee.com/SJR-Delta/POD-Com.pdf

That section of our comments on the third draft of Chapter 6 states,

"Based on the SWRCB D 1641 water rights decision, the California Interagency Ecological Program (IEP) and CALFED were supposed to address the impacts of diverting Delta water on quality/resource management issues. The synthesis report referenced above, as well as the Lee (2008) comments cited below discussed the CVRWQCB's listing of known water quality criteria violations as well as technical inadequacies in the approach that the IEP monitoring/CALFED followed to evaluate water quality problems associated with exceedances of water quality objectives. These issues are summarized in,

Lee, G. F., "Comments on CALFED Independent Science Board Review of IEP," Comments submitted to Interagency Ecological Program, February 4 (2008). http://www.gfredlee.com/SJR-Delta/Comments-ISB-Review-IEP.pdf

It is critical that DSC establish a program that requires that the SWRCB management of the IEP Delta monitoring of the Delta channels be focused on evaluating the impact of permitted water diversions on Delta water quality and Delta resources as required in D-1641."

Our comments on the fourth draft of Chapter 6 cited below:

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," Comments submitted to SWRCB, Sacramento, CA by G. Fred Lee & Associates, El Macero, CA, June 14 (2011).

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

stated,

"Impact of Water Diversions on Water Quality

The revised Chapter 6 is essentially silent on several of the key water quality issues that the DSC will need to address in developing and implementing the Delta Plan. The most important of these is the impact of diversions/manipulations of Delta flows on Delta water quality issues. As we have discussed in our comments to the SWRCB, in the past and in violation of the SWRCB D-1641 water rights decision, Delta flow diversions have been allowed to occur largely without regard to the impact, and follow-up evaluation of impact, on Delta water quality. In reviewing potential impacts of water flow manipulations on the Delta water quality the DSC should consider such issues as the low DO problem in the SJR Deep Water Ship Channel and the South Delta, the homing of the fall run of Chinook salmon to their SJR home stream waters in the SJR watershed, and impacts of the altered flow into and through Delta channels on the location, magnitude, and duration of impacts of pollutants on the beneficial uses of the Delta. While this issue was mentioned in the third staff draft, and briefly on page 106 line 3 of the fourth staff draft, a properly developed chapter on Delta water quality issues for the Delta Plan must include a discussion not only the water quality parameters of concern but also, and most important, factors affecting the impacts of the pollutants on Delta water quality/beneficial uses. A section of our comments on the third staff draft (found on pages 10 to 14) discusses these issues. A revised fourth staff draft of chapter 6 should be developed to correct this significant omission.

The fifth draft Chapter 6 continues to ignore the need for the DSC to require the inclusion of a proper evaluation of the impacts of Delta water diversions on water quality in the review of a "Directed Action" involving water diversions.

Page 135 presents Table 6-1, "**TMDLs Approved and Under Development in the Central Valley, Delta, and Suisun Bay.**" As in the previous drafts of Chapter 6, the fifth draft of Chapter 6 fails to mention that there are numerous well-known and significant water quality impairments of beneficial uses of Delta waters that the CVRWQCB has thus far failed to list as such. Page 5 of our comments on the third draft of Chapter 6 (cited above) included information on these issues as well as references to the following sources of more detailed discussion including:

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., "Comments on 'Delta Vision Strategic Plan Fourth Staff Draft Volume 2: Strategy Descriptions," Comments submitted to P. Isenberg, Chair, Delta Vision Blue Ribbon Task Force, Sacramento, CA. Report of G. Fred Lee & Associates, El Macero, CA, September 30 (2008). http://www.gfredlee.com/SJRDelta/ DeltaVisionStaffDraft4.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

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 'Delta Vision Strategic Plan Fourth Staff Draft Volume 2: Strategy Descriptions," Comments submitted to P. Isenberg, Chair, Delta Vision Blue Ribbon Task Force, Sacramento, CA. Report of G. Fred Lee & Associates, El Macero, CA, September 30 (2008). http://www.gfredlee.com/SJRDelta/DeltaVisionStaffDraft4.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

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., "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., "Agriculture-Related Water Quality Problems in the San Joaquin River," Proceedings of 2006 International Conference on The Future of Agriculture: Science, Stewardship, and Sustainability, Center for Hazardous Substance Research, Kansas State University, Manhattan, KS (2006). http://www.gfredlee.com/SJR-Delta/SJRAgAug06Paper.pdf

Those reports discuss chemicals/characteristics that are impairing Delta water quality but for which no water quality objectives have been developed. The following table summarizes that information.

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

Delta Impaired Waters Not Listed on CWA 303(d)

Ultimately, water quality objectives and TMDLs will need to be developed to control the water quality problems caused by those chemicals.

Page 142 line 5: The word, "micrometers" should be changed to "micromolar."

Page 142 line 27 and following: In our comments on technical deficiencies in the third staff draft Chapter 6 (cited above) we stated,

"The California Water Environmental Modeling Forum (CWEMF) develops peer reviews of modeling approaches and develops workshops on water modeling issues; Dr. Lee was asked to serve as a member of the CWEMF steering committee. With Dr. Jones-Lee he developed for the CWEMF a workshop entitled, "Overview of Delta Nutrient Water Quality Problems: Nutrient Load - Water Quality Impact Modeling," which was presented to an audience of about 100 in March 2008. Information on that workshop is available on the CWEMF website [http://www.cwemf.org] at:

http://www.cwemf.org/workshops/NutrientLoadWrkshp.pdf. Additional information on the workshop is available at:

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

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/SJRDelta/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

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

As noted in our review of DSC third draft Chapter 6 the work of Dr. Van Nieuwenhuyse should be mentioned at this location in Chapter 6. We stated in our comments on the third staff draft of Chapter 6:

"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. "As discussed in the van Nieuwenhuyse 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 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 inwaterbody concentrations effects reductions in the phytoplankton biomass in Delta waters. This occur 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.

The changes in the Delta ecosystem that occurred associated with Sac Regional decreased phosphorus discharges rather than the change in N/P ratios as discussed in the DSC staff third draft are a more likely cause of changes in the fish production than the change in the N/P ratios discussed by the staff in the third draft."

In our comments on the fourth draft of Chapter 6 we stated,

"Impact of N/P ratios

We discussed the inadequate coverage of the issue of the impact of N/P ratios on Delta aquatic life resources (beginning on page 21 of our comments on the third staff draft). The fourth staff draft discussion has been expanded to include the reference to the report by Cloern on this issue that we noted in our comments. However the revised Chapter 6 fails to mention a very important reference to the work of Dr. Erwin Van Nieuwenhuyse on phosphorus reduction issues, also noted in our previous comments."

"The importance of nutrients as a cause of water quality problems in the Delta is discussed in the revised third staff draft, now the fourth staff draft of Chapter 6. While considerable information on these problems is provided in the revised chapter, the draft fails to discuss and provide adequate reference to the most comprehensive review of the nutrient issues, i.e., the 2008 CWEMF Delta Nutrient workshop. Nutrient issues were discussed in our comments on the third staff draft, from page19 through part of page 21. The 2006 reference provided in the fourth staff draft to an outdated DWR report on nutrient issues is not adequate for providing the reader with current information on Delta nutrient water quality issues that need to be addressed. Of particular concern is the impact of nutrients on drinking water quality and the potential for controlling nutrients and their impacts. The fourth staff draft Chapter 6 continues to provide recommendations to the CVRWQCB on when it should develop nutrient criteria. We discussed the unreliability of recommendations pertaining to nutrients in our comments on the third staff draft." In the fourth, and now the fifth, draft of Chapter 6, the draft Delta Plan still fails to mention or provide reference to the work of Dr. van Nieuwenhuyse on the potential role of phosphorus in impacting phytoplankton populations in the Delta and the failure to mention the CWEMF Delta nutrient workshop represents a fundamental flaw in how the DSC staff have reviewed and incorporated information provided by DSC draft plan revoewers in revisions of the Plan.

Page 144 line 10+ The discussion concerning organochlorine legacy pesticides remains deficient in providing the DSC members and the public with information on the current situation on the occurrence of these pesticides in Delta fish. We discussed this deficiency in our comments on the Delta Plan third draft Chapter 6 where we stated on page 29,

"At the request of the CVRWQCB staff Drs. Lee and Jones-Lee developed, 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/OClTMDLRpt12-11-02.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/OCl-slides-SanDiego.pdf

Those reports discuss the more than 20 years of data that the SWRCB had collected on organochlorine legacy pesticides (such as DDT) in Central Valley waters, including Delta fish tissue, as part of the SWRCB Toxic Substances Monitoring Program. The Lee and Jones-Lee report and its supplement, for the first time, provided an analysis of the very large data base on excessive bioaccumulation of organochlorine compounds in edible fish. They found that in the 1960s-70s many of the Central Valley fish contained hazardous levels of toxic chemicals that are a threat to cause cancer in those who eat the fish. Their work also showed that while the concentrations in the fish had been decreasing, by the late 1980s there were still excessive concentrations of organochlorine legacy hazardous chemicals in some edible fish taken from the Delta and its tributaries.

In the mid 2000s the CVRWQCB obtained sufficient funding to conduct a limited sampling of Delta fish for organochlorine legacy pesticides and PCBs. Based on that updated base Lee and Jones-Lee developed,

Lee, G. F., and Jones-Lee, A., "Update of Organochlorine (OCl) '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 at that time, California Office of Environmental Hazard Assessment (OEHHA) had updated its approach for assessing the public health concerns about consuming fish with residues of organochlorine legacy pesticides. The combination of OEHHA "balancing" of the benefits of consuming fish against the cancer risk associated with consuming low levels of organochlorine pesticides resulted in very few exceedances of OHEHHA fish consumption screening values in Delta fish; the result was that the excessive bioaccumulation of these chemicals was no longer considered to be a major threat to those who consume fish taken from the Delta."

This is important information that the DSC and the public should have been made aware of in the fourth and now fifth draft of the Delta Plan Chapter 6.

Another highly significant deficiency in the fourth draft Chapter 6 that has not been rectified in the fifth draft Delta Plan Chapter 6 is the failure to discuss the significance of PCBs in Delta fish as a cause of cancer in those who use certain Delta fish as food. In our comments on the third draft Plan chapter 6 we discussed this issue beginning on page 30 where it was stated, *"The DSC third staff draft of Chapter 6 discussion of the water quality problems of excessive bioaccumulation of organochlorine chemicals is deficient in its failure to mention that Delta and tributary fish contained excessive concentrations of PCBs. PCBs are industrial chemicals (non pesticides). PCB concentrations in Delta fish tissue are one of the most important public health problems of PCBs in Delta fish has not decreased and OEHHA has reaffirmed it concern about the cancer threat of consuming fish with PCBs concentrations above OEHHA fish consumption guidelines. Lee and Jones-Lee discussed that there is need for ongoing monitoring of Delta fish for PCBs and to determine the source of the PCBs that are bioaccumulating in edible fish."*

Furthermore, in our comments on the fourth draft of Chapter 6 we stated, "*PCBs*

An important issue that deserves more attention than given in the fourth draft page 106 in impacting Delta water quality is the excessive bioaccumulation of PCBs in Delta fish. As discussed in our comments on the third staff draft of Chapter 6 beginning on page 30, PCBs are a group chemicals highly hazardous to public health that are being found in Delta waters/fish."

The DSC staff's failure to mention one of the most important public health hazards associated with the waters of the Delta, namely PCBs in edible fish, is another significant deficiency in the approach used by the DSC staff in developing its draft comments on Chapter 6 in the fifth draft Delta Plan.

Overall

Overall, the fifth draft of the Delta Plan Chapter 6 continues to inadequately inform DSC, stakeholders, and the public about important information on Delta water quality issues that need to be considered in formulating and implementing a final Delta Plan.