CALIFORNIA CENTRAL VALLEY
FLOOD CONTROL
ASSOCIATION

October 30, 2015

Delivered Via E-mail: BDCPComments@icfi.com
BDCP/CA WaterFix Comments
P.O. 1919
Sacramento, CA 95812

Subject: CCVFCA Comments on the Partially Recirculated Bay-Delta Conservation Plan EIR/EIS with New CA WaterFix Sub-Alternatives

Dear ICFI Consultants:
On behalf of more than 75 members, the California Central Valley Flood Control Association ("CCVFCA"/"Association") submits these comments on the Draft Bay Delta Conservation Plan ("BDCP") with new CA WaterFix sub-alternatives and the accompanying Recirculated Draft Environmental Impact Report/ Supplemental Draft Environmental Impact Statement ("RDEIR/SDEIS").

This consolidated set of comments is intended to provide a more comprehensive, representative flood management perspective, rather than comments of individual member agencies. However, these comments are also being submitted on behalf of the following reclamation districts that are members of the Association:

- Reclamation District 501
- Reclamation District 551
- Reclamation District 563
- Reclamation District 900
- Reclamation District 999
- Reclamation District 2060
- Reclamation District 2068

The following resource documents are hereby submitted as supplemental information utilized in preparation of these comments:

Exhibit A:
Dan Steiner and MBK Engineers, *Review of Bay Delta Conservation Program Modeling* (June 20, 2014);

Exhibit B:
MBK Engineers, *Technical Comments on Bay-Delta Conservation Plan Modeling* (July 29, 2014)

Exhibit C: MBK Engineers, *Technical Comments on Bay Delta Conservation Plan/CA WaterFix* (October 28, 2015)

Exhibit D: Delta Independent Science Board, *Review by the Delta Independent Science Board of the Bay Delta Conservation Plan/California WaterFix Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement* (September 30, 2015)

All of the comments and recommendations contained herein are proposed as alternatives and/or mitigation measures to reduce significant environmental impacts and should therefore be treated as such for purposes of responding to these comments pursuant to NEPA (40 CFR § 1503.4) and CEQA (14 CCR § 15088). Accordingly, the Association expects responses to all comments and recommendations contained herein.

I. INCORPORATION OF PREVIOUS COMMENTS BY REFERENCE

All of the extensive legal and technical comments on the 2014 Draft Bay Delta Conservation Plan (BDCP) and Environmental Impact Report/Environmental Impact Statement (EIR/EIS) contained in letters submitted by the following, as well as the October 29, 2015 letter by Reclamation District 551 are incorporated by reference herein.

1. Contra Costa Water District, July 25, 2014
2. North State Water Alliance, July 28, 2014
3. North Delta Water Agency, July 29, 2014
4. Local Agencies of the North Delta, July 29, 2014

CCVFCA anticipates that Contra Costa Water District, North State Water Alliance, North Delta Water Agency, and the Local Agencies of the North Delta will submit additional comments on the CA WaterFix RDEIR/SDEIS, and all of those comments are likewise incorporated herein by reference.

II. SUMMARY OF CCVFCA COMMENTS ON BDCP/WATERFIX

Key issues of concern CCVFCA has with BDCP/CA WaterFix project alternatives and associated EIR/EIS are:

1) ***Indecipherable*** - Document organization and relationships between BDCP analysis and CA WaterFix alternatives is confusing at best, and sometimes incomprehensible.

2) ***Conceptual*** – The project design/description is preliminary and subject to change, so the impact analysis conclusions are mostly conjecture based on limited facts or actual assessment.

3) ***Incomplete*** – Project operations rely on levee corridor through the Delta for conveyance to south Delta pumps, but comprehensive levee and flood protection analysis is deferred, and cost-sharing of levee maintenance is absent.

4) ***Pre-Determined*** – Submission of 404 permit to USACE and change of diversion petition to SWRCB appear to have already determined the outcome of the ongoing CEQA/NEPA environmental review process.

There is acknowledgment throughout the new CA WaterFix documents that the facilities construction under Alt. 4A would be identical to that of Alt. 4, with similar operations. (e.g., Water Supply chapter, page 4.3.1-1, lines 3-6, 2015 DREIR/DSEIS). Because the construction, operation, and impacts of the new CA WaterFix preferred alternative (Alt. 4A) is substantially similar to the prior preferred alternative (Alt. 4), most of the significant adverse impacts identified in the 2014 BDCP Alt. 4 still apply to CA WaterFix Alt. 4A.

In CCVFCA's view, the CA WaterFix project description and environmental analysis is a jumbled mess, resulting in a complex labyrinth that is hard to navigate, and even harder to decipher. The degree of difficulty is heightened by the fact that the new alternatives rely on modeling done for BDCP and continually refer back to BDCP alternatives for project description and environmental impact analysis.

For example, throughout the CA WaterFix chapters, the impact analysis and conclusions for Alt. 4A refer to BDCP Alt. 4, which then often refer readers to BDCP Alt. 1A for a description of how CEQA/NEPA conclusions and mitigation measures were determined.

Simply put, the Association finds that the description of CA Waterfix construction and operation is often internally inconsistent, preventing a full and meaningful disclosure of the scope, purpose, intensity, duration, and true effects in the RDEIR/SDEIS. This is not unexpected since the design is still at a very preliminary conceptual level according to the July 1, 2015 Conceptual Engineering Report by the Delta Habitat Conservation & Conveyance Program (DHCCP).

Finally, the Association joins in the Delta Independent Science Board's (ISB) recent assessment of CA WaterFix that the interdependence of water conveyance, levee maintenance, and habitat restoration in the Delta warrant an environmental impact assessment that is more complete, comprehensive, and comprehensible than the current RDEIR/SDEIS." Their following observations additionally capture additional inherent deficiencies:

- "The Current Draft contains a wealth of information but lacks completeness and clarity in applying science to far-reaching policy decisions." (09-30-15 cover letter)
- "It defers essential material to the Final EIR/EIS and retains a number of deficiencies from the Bay Delta Conservation Plan Draft EIR/EIS." (09-30-15 cover letter)

- "The missing content is needed for evaluation of the science that underpins the proposed project. Accordingly, the Current Draft fails to adequately inform weighty decisions about public policy." (Pg 4)
- "Far-reaching decisions should not hinge on environmental documents that few can grasp." (Pg 9)

III. ASSOCIATION HISTORY AND INTEREST IN BDCP

A. Association History

In existence since 1926, the Association was established to promote the common interests of its membership in maintaining effective flood control systems in California's Central Valley for the protection of life, property, and the environment. Association members include reclamation and levee districts, plus cities and counties with flood management responsibilities along the Sacramento and San Joaquin Federal Project and non-Project levee systems within the Sacramento-San Joaquin Delta.

B. Protection of Flood Management System

The Association's specific interest is assuring that the construction, mitigation, and operation activities proposed in BDCP/WaterFix alternatives will not in any way impede, diminish, or impair the flood flow capacity or functionality of the State and Delta's levee systems. These flood facilities are integrated and dependent on each other to operate as a system to protect people and property year-round, but particularly during flood events, and their public safety function must not be compromised.

IV. CENTRAL VALLEY FLOOD PROTECTION BACKGROUND

A. History of Reclamation in the California Central Valley

In 1850 Congress approved the Arkansas Act granting several states title to all of the Swamp and Overflowed Lands, including approximately 2 million acres in California. [1] The State considered the reclamation of these swampy lands essential because of their extraordinary fertility when drained (reclaimed) and also because they posed a significant public health risk due to outbreaks of malaria from the mosquito breeding. The State and Federal government therefore proceeded to actively encourage the reclamation of these lands for purposes of productive farming.

Historically, more than 40 percent of Northern California's runoff flowed to the Delta via the Sacramento, Feather, San Joaquin, and Mokelumne Rivers, with peak winter flows resulting in substantial flooding in the valley floor about every ten years. In its natural condition, about one-quarter of the Central Valley extending along more than 14 counties was subject to annual or

[1] Arkansas Swamp Lands Act, Act of September 28, 1850, codified at California Public Resources Code Section 7552, 7552.5.

periodic overflow, so the first flood-control projects were the low levees the farmers built to protect their lands from inundation.

Flood damage in the Sacramento Valley and Delta occurs almost entirely from rain floods, principally on Sacramento, Feather, Bear, Yuba, and American Rivers as well as Stony, Cache, and Putah Creeks, with smaller creeks also causing localized flooding. The Delta also experiences damaging floods along the San Joaquin River and its tributaries including the following stream groups: Mokelumne River, Calaveras River, Littlejohn Creek, Merced County, Madera County, and Fresno County. Currently, most snow-melt run-off is stored or diverted for beneficial uses or passes harmlessly to the ocean, but prolonged high-water stages can cause seepage through levees if they are not vigilantly maintained and improved to withstand the occasional flood event with excessive run-off draining through the Central Valley and Delta.

B. SRFCP Purpose and History

The Sacramento Valley and Delta now receives a substantially higher level of flood protection. Authorized by Congress in 1917, the Sacramento River Flood Control Project (SRFCP) and San Joaquin River Flood Control Project (SJRFCP) is a system of "Project levees" and flood bypasses designed and built by the U.S. Army Corps of Engineers (USACE/Corps) for three purposes:

1) Flood control;
2) Reclamation of marshy lands for farming and other productive uses;
3) Improvement of navigation.

By 1949, over 90 percent of the SRFCP and SJRFCP project works had been completed and in operation. Today, there are more than 1,600 miles of State-federal Project levees in the Central Valley, 385 miles of which are located in the Delta.

More than 700 miles of additional Delta levees are classified as "non-project." The key component of the SRFCP system, the Yolo Bypass, carries 80 percent of the water at the latitude of Sacramento during extreme floods. All of these Project and non-Project levees and flood bypasses serve to protect $70 billion in infrastructure in the Central Valley, including the State's water conveyance infrastructure.

This comprehensive system of SPFC flood control facilities is the largest flood management system in California. Collectively, the facilities, lands, programs, conditions, and mode of O&M for the State-federal flood protection system in the Central Valley are referred to as the State Plan of Flood Control (SPFC).[2]

[2] Public Resources Code (PRC) Section 5096.805 (j). A complete description of these assets and resources has been compiled by DWR into the *State Plan of Flood Control Descriptive Document,* available at http://www.water.ca.gov/cvfmp/docs/DRAFT_SPFC_Descriptive_Doc_20100115.pdf

V. RISKS TO FLOOD CONTROL PURPOSE, FUNCTION, EFFECTIVENESS

In 1953, the SPFC works were transferred to California with a memorandum of understanding (MOU) confirming the State's obligation to operate and maintain all completed works/facilities and to hold the federal government harmless.[3] In addition, the State has signed assurance agreements with the U.S. Army Corps of Engineers to maintain the San Joaquin River Flood Control Project in accordance with the 1955 MOU.

Jurisdiction and authority throughout the drainage basin and for the 1.7 million acres within the state's Sacramento and San Joaquin Drainage District (SSJDD) is the responsibility of the Central Valley Flood Protection Board (CVFPB/Board).[4] Created by State legislation in 1913, the SSJDD holds the property rights on about 18,000 parcels of SPFC lands, some going back to 1900.[5] Annual inspections of the SPFC levee system are conducted twice annually by DWR.[6]

This comprehensive interconnected system of levees is absolutely critical to public health and safety, including the protection of the region's transportation, agriculture, business, homes, and even water conveyance.[7] Levees in the Delta (Plan Area) provide this protection at all times, during two daily high tides and seasonal high-flow events.

Under California law, no modification to the SPFC system (encroachment or project) may be constructed on or near the Sacramento and San Joaquin Rivers or their tributaries until plans have been reviewed and the projects have been approved or a permit issued by the CVFPB.[8] The Board authorizes use of the SPFC facilities by issuing encroachment permits only *if the project is compatible with the flood system and will not hamper the State's O&M responsibilities.*

The, BDCP/WaterFix alternatives and RDEIR/SDEIS must embrace – as a fundamental permit condition – the requirement that the existing level of flood protection be maintained to protect people, property, infrastructure, habitat, and conveyance. As most public agencies within the Delta are constantly upgrading their level of flood protection, it is also essential that BDCP does not create a new barrier to future ability to increase local level of flood protection.

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[3] 1953 Memorandum of Understanding (USACE and The Reclamation Board, 1953) and Supplements. Available at ftp://ftp.water.ca.gov/mailout/CVFPB%20Outgoing/Orientation%20Materials/Item%203C%20-%20LM%20Assurance%20Agreements/Example%201%20-%20srfcp_mou_1953%20--%20jsp%20copy.pdf.

[4] Authority rests in the Flood Protection Board pursuant to assurance agreements with the USACE and the USACE Operation and Maintenance Manuals under Code of Federal Regulations, Title 33, Section 208.10 and United States Code, Title 33, Section 408

[5] Central Valley Flood Protection Board webpage, "Sacramento-San Joaquin Drainage District Jurisdiction Maps." Available at http://www.cvfpb.ca.gov/cvfpb/ssjdd_maps/

[6] 2013 Inspection and Local Maintaining Agency Report of the Central Valley State-Federal Flood Projection System (providing that "DWR, under the authority of Water Code § 8360, § 8370, and § 8371, performs a verification inspection of the maintenance of the SRFCP levees performed by the local responsible agencies, and reports to the USACE periodically regarding the status of levee maintenance accomplished under the provisions of Title 33, Code of Federal Regulations (CFR), Section 208.10. While there are no specific water code provisions directing DWR to inspect and report on Maintenance of the San Joaquin River Flood Control System, DWR has performed inspections and provided reports for many years as a matter of practice that is consistent with Title 33, CFR.") Available at http://cdec.water.ca.gov/current_reports.html.

[7] DWR *A Framework for Department of Water Resources Integrated Flood Management Investments in the Delta and Suisun Marsh* (September 24, 2013)

[8] Central Valley Flood Protection Board , A Century of Progress: Central Valley Flood Protection Board 1911-2011 (2011). Available at http://www.cvfpb.ca.gov/Publications/DWR100Years_05.pdf

All three of the new diversion intakes and the five barges in BDCP/WaterFix alternatives are encroachments on SPFC facilities, requiring permit approvals from the USACE, CVFPB, and local reclamation districts.

A. Fails To Analyze Increased Flood Risks From Substantial Alteration the Location, Configuration, and Purpose of SPFC

Following are specific examples of CM1 construction actions (not including mitigation measures) that may impact (adversely or beneficially) existing flood protection facilities and system design flow capacities:

- Construct 3 intakes on Sacramento River eastside levee within 4 mile stretch (possibly moving these levees too?);
- Erect at least eight in-water cofferdams in Sacramento River and several Delta channels (three intakes and five barge loading facilities);
- Construct cutoff walls down middle of levees to prevent seepage;
- Increase sediment loading and removal at intake locations;
- At each of the three intakes, install 12 large gravity collector box conduits through the levee prism to convey flow to the sedimentation system on the landside (total of 36 levee penetrations);
- Construct 5 barge landings on levees;
- Permanent barrier at the head of Old River;
- Modify approximately six miles of levees, on either a temporary or permanent basis;
- Blocking, re-aligning, re-routing, and removal of state highways, county and private roads with levees underneath pavement;
- Removal and local storage/disposal of approximately 30.7 million cubic yards of tunnel muck;
- Removal and local storage/disposal of approximately 8 million cubic yards of dredged material; and
- Installation of power lines over existing levees.

Following are impacts related to BDCP/WaterFix activities that specifically require more analysis, disclosure, and mitigation than what is provided in the current Draft:

- Damage to levee integrity and stability from tunnel muck haulage and other construction activities (that go way beyond the design and intended use of these rural facilities), seepage and erosion scour, intensive pile driving, and increased subsidence and sink holes from CM1 dewatering;
- Deflection and obstruction of flood flows in selected Delta channels due to cofferdam construction for three intakes and five barges, levee reconfigurations, sediment loading, and other construction activities that may redirect flows and alter flood risks throughout the ten-year construction timeframe;
- Impairment of ditches, pumps and other interior drainage facilities vital to the maintenance of low-lying Delta lands through the discharge from CM1 dewatering activities, disconnecting interconnected drainage systems, and seepage waters exceeding existing local capacity;

- Obstruction of levee maintenance, flood fighting and emergency response activities through the clogging of Delta levee roadways and channels with construction traffic and equipment, and through the monopolization of barges and repair materials;
- Interference with long-standing levee maintenance and repair programs in the Delta through usurpation of habitat mitigation opportunities on which these programs depend;
- Cumulative effects on the flood control system, particularly SPFC facilities and operations.
- Regulatory constraints on implementing mitigation (e.g., USACE's no vegetation on project levees policy, obtaining anticipated dredging permits);
- Impacts reducing the current level of flood protection achieved with recent Prop. 13, 1E, and 84 investments;
- FEMA building requirements and NFIP flood insurance eligibility;
- Evacuation plans for communities (residents, businesses, schools, tourists, etc) in the Plan Area.
- Financial impacts to RDs in the Plan Area (e.g., reduced assessment revenues during the 10-year construction, increased maintenance costs to deal with seepage/erosion damage, increased drainage pumping costs);
- Increase in FEMA flood insurance rates and building restrictions, or PL 84-99 eligibility problems as a result of BDCP/WaterFix project construction.

The Association requests that the BDCP/WaterFix project alternatives and RDEIR/SDEIS be revised to address the multiple levee integrity and general flood control challenges above and be recirculated again for public review and comment.[9] In addition, prior to final certification of the EIR/EIS, DWR should execute a binding agreement with the Central Valley Flood Protection Board (CVFPB) and local RDs to:

1) Establish general principles and guidelines for any proposed alterations of flood control facilities in the Plan Area, particularly those affecting the State Plan of Flood Control's (SPFC) location, configuration, purpose, and functionality;
2) Design and operate BDCP/WaterFix conveyance construction and operation to be consistent and complementary to the modifications of the SPFC and other flood protection facilities currently being planned in the Central Valley Flood Protection Plan (CVFPP) process, including Regional Plans;
3) Avoid impacts that reduce the level of flood protection recently achieved from the construction of flood protection projects in the Plan Area that were financed with local, State and Federal funding (i.e., Prop. 1E and 84, WRRDA appropriations) as well as projects planned for implementation in the near future pursuant to the CVFPP or U.S. Army Corps of Engineers' ongoing feasibility studies in the Plan Area.

[9] PRC Section 21092.1 and Guidelines Section 15088.5 require an EIR to be re-circulated whenever significant new information has been added to the EIR after the draft has been available for review, but prior to certification of the final EIR. The addition of these omissions and providing the required analysis, disclosure, and mitigation would constitute significant new information.

B. Cofferdams and In-Water Intakes Create Additional Construction Impacts

According to the BDCP/WaterFix documents, several encroachments into the Sacramento River and tributary Delta channels associated with the 10-year construction of CM1 will occur, including eight separate cofferdams in the Sacramento River and tributaries.

The three new intakes alone will occupy a total of 7.5 acres of the Sacramento River between river miles 37 and 41, leaving only about 380-580 feet open for flood flows in this four-mile stretch during the 4-6 year construction period. Yet, the EIR/EIS for BDCP/WaterFix alternatives assumes there will be no reduction in flood capacity because both of the permitting agencies will require the project to be flood-neutral and will therefore require mitigations such as setting back the levees on the other side of the river.

The setback of levees as CA WaterFix construction mitigation or USACE 408 permit requirement is no small undertaking. Setting back the Project levee on the Westside of the Sacramento River as mitigation for CM1 temporary cofferdams and permanent intakes could also include seepage berms, relief wells, and cutoff (slurry) walls. In some cases, setback levees can themselves alter the flood flows, creating additional impacts that must be mitigated by project proponents.[10]

Glossing over the setback of the Westside levee represents a significant omission of environmental impacts, because such an action would require the condemnation of significant number of acres, houses and businesses. Permanent crops and county roads will also be affected, causing even greater disruptions to agriculture and transportation than those disclosed in the RDEIR/SDEIS.

One option to reduce adverse impacts to levees is to phase construction, building only one intake and/or one tunnel at a time instead of concurrently.

C. Disrupts Levee Inspections, Maintenance, And Improvements For A Decade

Local Reclamation Districts (RDs) are responsible for daily inspection of levee conditions for issues such as cracks, slippage, encroachments, seepage, burrowing animals, etc., as well as for performing routine maintenance activities on and around the levees in order to meet USACE and FEMA levee standards. DWR conducts levee inspections twice a year and the USACE conducts more extensive Periodic Inspections every 5 years of the SPFC project levees.

Over the 10-year Project construction period, local RDs, DWR, and USACE will be unable to conduct levee inspections, conduct levee maintenance or construct repairs or improvements due to competition or blockage by BDCP/WaterFix construction activities and equipment staging. In addition, during an emergency, RDs and other responders may not be able to provide floodfighting if they are denied access to an area or are unable to stage equipment.

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[10] *See, e.g.*, DWR, Sutter Bypass RMA2 Model Report (Construction of setback levees not recommended because"Model results indicate that although peak water levels in the Feather River are reduced significantly by the setback levee, water levels in the Sutter Bypass increased as a result of the revised levee configuration.")

Disruptions to the routine levee inspection and maintenance, as well as RD drainage and floodfighitng responsibilities will mostly be hindered due to the multi-year construction of two forebays and the 60.2 miles of main tunnels and 13.7 miles of northern tunnels connecting to the three new intakes, which will prevent access to large areas of an extensive construction zone.

In some cases, DWR may need to assume all levee maintenance and floodfighting responsibilities for several reaches of levees, particularly if there are not enough remaining landowners to sustain funding of levee maintenance and island drainage after lands are condemned for CM1 construction.

DWR should consider phasing construction and immediately engage local RDs, the CVFPB, DWR's levee inspection branch, and USACE to negotiate a memorandum of agreement (MOA) between these entities as to how levee inspections and annual levee maintenance will be performed during the 10-year construction of CM1 amid the planned staging of construction equipment, construction traffic, and/or road re-routing.

D. Dewatering Discharges and Drainage Disconnections Increase Inundation

As stated in the EIR/EIS *Groundwater Chapter*, the existing drainage facilities in the Plan Area are "intricate networks" of canals, ditches, pipes, and pumps which means they have been carefully designed to function as a system and located to work with gravity and the natural land contours and drainage patterns that exist on the Delta islands. Therefore, any disconnection potentially renders the whole system inoperable.

Because EIR/EIS confirms that successful agriculture is dependent on the operation of this drainage system and clearly states the islands will become flooded without the drainage systems functioning properly, the seepage, runoff, and dewatering discharges during CM1 construction are significant and adverse impacts to the ongoing flood maintenance responsibilities or RDs and to agricultural productivity of lands.

We could not find data on existing conditions for seepage areas where construction is planned, despite this information being readily available, including in DWR Bulletin 125 seepage investigations on Delta islands. In addition, the July 1, 2015 Conceptual Engineering Report by DHCCP[11] acknowledges that geotechnical information for the proposed tunnel alignment is currently limited and the estimated flood levels to be used in the design for each conveyance option facility is still be developed.

BDCP/WaterFix alternatives, including Preferred Alternatives 4/4A, would involve extensive excavation, grading, stockpiling, soil compaction, and dewatering, resulting in temporary and long-term alteration and disruption of drainage patterns, paths, and facilities. These alternatives assume being able to discharge the dewatering volumes into local irrigation/drainage ditches, but there is NO EXTRA CAPACITY in these local facilities and therefore CANNOT be used by BDCP/WaterFix project.

[11] Delta Habitat Conservation & Conveyance Program (DHCCP), *Conceptual Engineering Report: Modified Pipeline/Tunnel Option – Clifton Court Forebay Pumping Plant*, Volume 1, (July 1, 2015)

Increased water volumes from 24/7 dewatering discharged into the rivers and waterways would increase surface water elevations locally, and erosion and scour on adjacent levees may create adverse impact depending on the velocities and volumes of water being discharged. The impacts associated with the water quality from dewatering discharges and to tunnel muck storage/disposal should also be acknowledged and mitigated in either the *Water Supply* or *Agricultural Resources* Chapters of the EIR/EIS. Mitigation should specify that before more stress/increases in peak flows can be added to Delta rivers or tributaries, the project proponent (DWR/USBR) will need to pay for actions to improve the current flood capacity in some channels and drainage ditches prior to CM1 construction.

CCVFCA recommends the EIR/EIS:

- Examine existing conditions in terms of interconnected drainage systems and whether CM1 construction will disconnect or disrupt the existing drainage facilities' ability to function/drain effectively;
- Identify specific discharge locations, how many locations, the capacity of the discharge location or what its capacity availability is based on local usage/needs (winter drainage or summer irrigation)
- Quantify the daily discharge rates and volumes from CM1 dewatering;
- Identify how long dewatering and subsequent discharges will occur at each location;
- Identify and analyze the additional drainage maintenance works and costs BDCP will need to assume in order to keep the drainage facilities functioning and able to accommodate the increased dewatering discharges.

E. Construction Dewatering Increases Delta Land Subsidence

Primarily limited to interior portions of the Central Delta, land subsidence has slowed in recent years in the Delta, which has allowed landowners and reclamation districts to keep pace with it and manage it over time. However, according to the EIR/EIS Chapters on *Geology* and *Soils* CM1 construction could potentially increase Delta subsidence and sinkholes as a result of the widespread and intensive 2/47 dewatering that will occur during the 10-year construction period.

With dewatering pumps placed every 50 to 75 feet around the entire perimeter of all the CM1 facilities under construction, each pumping between 240 to 10,500 gallons per minute, the EIR/EIS estimates the groundwater will be lowered 10-20 feet for a 2,600-foot radius from each pump. However, because CA WaterFix is still at a preliminary conceptual design level, we could find no studies or references to any evidence to support how the lowered groundwater depth or the radius of influence were determined, so they appear to be nothing more than professional guesstimates without any factual surveys or technical analysis to verify these claims.

This amount of intensive, long-term dewatering has the potential to destabilize the soils, resulting in sink holes and subsidence in a large area in the North Delta where the intakes and forebay with connecting pipelines will be built as well as the length of the 34-mile-long twin tunnels. Damage to the existing interconnected drainage and irrigation systems due to sinking land will increase localized flooding of crops, fruit packing sheds, and homes if drainage systems

cannot perform as designed and built. These individual and cumulative impacts need to be analyzed, disclosed, and mitigated.

The chapter should also include a map depicting the levees and drainage facilities (ditches/pipes/canals/pumping stations) that are expected to experience subsidence or liquefaction due to dewatering activities.

F. Extensive and Concurrent Pile Driving Could Destabilize Levees

Concerns over levee stability and their performance during a seismic event are some of the primary reasons Project Proponents state for building the new facilities in CM1. Intensive and sustained ground-shaking from hundreds of construction trucks on levee roads 24/7 and 700 pile-driver strikes driving in more than 1,000 total piles for construction of the three new North Delta intakes[12] will adversely affect the stability of the nearby levees.

The sustained intensive localized vibration for such a long duration as contemplated in the CM1 construction description could cause stress fractures and possibly levee failures, but is not acknowledged as an adverse impact or mitigated.

We could find no technical analyses, data, or scientific research evaluating how the excessive pile driving described in CM1 will affect the integrity and stability of nearby levees; most of which are SPFC Project levees. Failure to conduct a rigorous analysis in accordance with NEPA § 1502.13(a) of the potential risk of levee failure and effects on the overall performance of the SPFC in a high water flood event is a glaring and serious omission that needs to be corrected in the EIR/EIS and again recirculated for public review and comment.

The cumulative effects of pile driving and dewatering on reducing levee stability and increasing land subsidence/sink holes in the CM1 construction area should be acknowledged and mitigated pursuant to CEQA/NEPA. A map should be included in the EIR/EIS *Surface Water Chapter* depicting the locations of all pile driving for CM1 facilities (including but not limited to intakes, forebays, pipelines, tunnels, shafts, sedimentation basins, barge loading facilities, etc.) and the radius of influence for any related subsidence.

To reduce the impacts to levees, the Association recommends the addition of a mitigation measure requiring the construction of new diversion intakes and tunnels be phased, installing one at a time, instead of building concurrently as proposed in BDCP/WaterFix alternatives.

G. Heavy Construction Vehicles and Increased Traffic Volumes Significantly Erode Integrity of Local Levees and SPFC

The lack of knowledge of existing conditions in the Plan Area is particularly evident in the *Transportation Chapter*. The chapter fails to acknowledge that most of the roads and highways in the Delta are in fact pavement on top of a levee (both project and non-project levees). Consequently, the transportation study only analyzed two things: road surface conditions and traffic patterns/volume (level of service) and therefore failed to analyze, disclose impacts, or

[12] Representing a total of 700,000 total pile drive strikes just for the 3 intakes

provide mitigation for the daily wear and tear on levees that the thousands of construction trucks on Delta roads 24/7 for ten long years will cause.

The amount of construction truck activity over 10 years exceeds the weight and traffic volume that current levees upon which much of the construction trucks will travel over are designed and will degrade them to a point of reducing their stability which could result in a levee failure during CM1 construction.

As noted by the Central Valley Flood Protection Board's and Delta Stewardship Council's 2014 comments on the BDCP, this simple, qualitative traffic analysis provided by the BDCP EIR/EIS will not adequately assess the potential for damage to levees that are underneath the roads. The Board correctly explains the potential for impacts to the levees themselves, including the possibility of "deformation and crest depression due to non-uniform settlement and damage to levee slopes due to use of levee hinge points for vehicle turn-outs."

The local Reclamation District (RD) is responsible for the regular inspection of levee conditions (cracks, slippage, encroachments, seepage, burrowing animals, etc.) and for performing routine maintenance activities on and around the levees in order to meet USACE and FEMA levee standards. Their efforts will be hindered by any blockage or access issues caused by construction activities and extensive truck traffic. Indeed, the construction activities and extensive truck traffic may lead to a need for more frequent inspections, the cost and manpower requirements of which have not been disclosed, analyzed, or mitigated in the EIS/EIR.

From a public safety standpoint, it is critical for DHCCP consultants to immediately consult with local RDs, the CVFPB, DWR's levee inspection branch, and the USACE to discuss drafting a specific mitigation measure to deal with the effects that staging of construction equipment, construction traffic, and/or road re-routing will have on levee inspections and routine levee maintenance to be performed during the 10-year construction period.

All of the levees to be used during CM1 construction will need to be stabilized and fortified every spring during all 10 construction years and will need to meet the same level of public safety condition the levee was in prior to implementation of construction <u>at no cost to the local levee maintaining agency, landowners, or county governments</u> once CM1 is completed. CVFPB's regulations, Title 23, contain general guidelines on levee maintenance and restoration to a certain condition that must be followed; however in order for RDs to provide the lead agency with more specific mitigation measures they will need more specific construction and project details such as (but not limited to):

1) The number of construction vehicles/equipment expected to drive on roadways in the Plan Area;
2) The approximate weight of vehicles expected to frequently drive on roadways in the Plan Area;
3) The approximate start and end date for heavy construction traffic usage;
4) Whether construction traffic will be 24/7 or be limited to certain days and hours on all roadways identified for use in the Plan Area;
5) Provide results from studies and analyses conducted that have tested the weight and multiple load tolerance levels of existing levees underneath roadways to be heavily used in CM1 construction.

Technical studies should immediately be conducted and a new CEQA/NEPA Impact added to the *Transportation Chapter* disclosing the level of impacts CM1 construction traffic will create on levees underneath roads proposed for use in the Plan Area. A map should also be added to the chapter depicting which SPFC Project and non-project levees that will be impacted by increased traffic volumes.

H. Sediment Loading Reduces Flood Flow Capacity

CM1 conveyance construction is expected to increase sediment loading and place fill (dirt) in waterways in the Plan Area, which is also described in the 404 permit submitted to the USACE for the CA WaterFix project. Increased sediment amounts in most described areas would result in reduced flood capacity and higher risks of overtopping.

Based on our experience, the amount of in-water dredging the BDCP/WaterFix alternatives expect to conduct in order to prevent overloading of sediment is unrealistic and infeasible from a regulatory permitting standpoint. Therefore, the reduction in sediment impacts that the EIR/EIS claims is overly optimistic and more severe impacts to flood flow capacity are likely to occur as a result of the multiple CM1 construction activities (eight temporary cofferdams, three permanent in-water intakes, five multi-year barges, 24/7 dewatering for 10 years).

Project proponents should conduct an analysis of the multiple activities increasing sediment in areas of the Plan Area with specific emphasis on the cumulative impacts to flood control facilities, O&M costs and activities.

I. Emergency Response And Flood Recovery Conflicts

Risk from levee failures can be reduced, but not eliminated, so being prepared for a flood emergency is the best defense. This requires having an effective strategy for preventing failures with ongoing levee improvements and maintenance, protocols for responding with emergency flood fighting activities, and a plan for levee repair and local recovery after the flood event.

Based on the flood history in the Delta, the BDCP/WaterFix project is guaranteed to experience at least one major flood event during the 10-year construction period. In addition to modification of the SPFC levee system, BDCP/WaterFix preferred alternatives propose extensive alteration of the existing Delta road configuration, including re-routing and blocking local roads and highway segments. EIR/EIS fails to analyze these impediments to a safe and timely evacuation during a flood or other emergency.

The inability to quickly floodfight and repair a damaged levee will result in loss of life and property in the area protected by that levee, and could have the domino effect of causing neighboring levee failures if CM1 construction activities/equipment prevent access to the levee break or key floodfighting personnel and supplies.
DWR should identify through MOUs with local emergency response agencies a clear chain of command regarding who pays for what, coordination of response and funding, and cooperative effort to pursue federal reimbursements for recovery; and to mutually develop a flood emergency

response plan that addresses floodfighting, worksite and community evacuation, and levee repairs.

VI. CEQA/NEPA DEFICIENCIES

A. Inadequate Project Description

A proper environmental analysis of a project of this size and scope requires an accurate, stable, and finite description of all major project components and the existing baseline conditions. Otherwise, the public cannot determine the true nature and extent of the actual impacts likely to be caused by the Project.
However, a recent DWR engineering report discloses that CA Waterfix design is still at a very preliminary conceptual level:

- alignment and alignment features are "preliminary and subject to change"
- alignment and alignment features will ultimately "need to be verified as part of additional investigations and detailed design."
- the facility locations, dimensions, and elevations (both topographic and facility) are "approximate" and "subject to change"
- geotechnical information for the proposed tunnel alignment is currently limited, so preliminary designs will be refined "once adequate geotechnical investigations have been performed."

A specific example of the preliminary stage that one of the project components, borrow/fill availability is described in the DWR engineering report: "At this point in project development, sufficient geotechnical information is not available to fully assess the suitability of borrow areas near the MPTO/CCO alignment to determine if adequate quantities of borrow material are actually available." The report further acknowledges, "Additional explorations, land ownership considerations, and engineering analyses are needed to better define the actual borrow sites and associated borrow quantities that will be used for the work."

CCVFCA contends that this information is readily available, but Project Proponents simply have not spent the time or money to collect such data despite being in the 9th year of project planning. For instance, CA WaterFix could find a great deal of baseline data on the system of levees in the Plan Area in the technical documents included as part of the CVFPP.

NEPA requires that the proposal in an EIS is properly defined (§ 1502.4(a)). Under CEQA, the fundamental purpose of an EIR "is to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action."[13]

Unfortunately, trying to decipher the description of the project's new alternatives is particularly daunting. For instance, the conclusions for Alt. 4A often refer to BDCP 4 impact analysis, which then refers readers to BDCP sections n BDCP Alt. 1A. Frankly, the project is a jumbled mess, resulting in a complex labyrinth that has created an even higher level of navigation difficulty and

[13] (CEQA Guidelines §15003(d), citing *People ex rel. Department of Public Works v. Bosio* 1975

fails to substantiate environmental conclusions, as pointed out in several reviews by scientific panels.[14]

B. Uncertainties Confounded by Significant Analytical Omissions and Data Gaps

Under CEQA the lead agency's factual conclusions must be supported by substantial evidence – facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts (CEQA Guidelines §15384(b)). Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion asserting nothing more than "it is reasonable to assume" that something "potentially may occur" is not analysis supported by factual evidence (e.g.; 2,600 dewatering radius).

There are too many chapters and individual impact statements that rely on conjecture instead of providing evidence to support the CEQA/NEPA conclusions to list them all. The following are general examples of the extensive amount of environmental analysis that is lacking from the Delta ISB's review of CA Waterfix:

- "the Current Draft fails to consider how levee failures would affect the short-term and long-term water operations spelled out in Table 4.1-2." (Pg 7)
- "The Current Draft does not evaluate how the proposed project may affect estimates of the assets that the levees protect." (Pg 8)
- "Neither the Previous Draft nor the Current Draft, however, provides a resource chapter about Delta levees." (Pg 8)
- "Although sensitivity modeling was used to address the effects of changes in the footprint and other minor changes of the revised project, full model runs were not carried out to assess the overall effects of the specific changes." (Pg 11)
- "Current draft generally neglects recent literature, suggesting a loose interpretation of 'best available science.'" (Pg 11)
- "Confounding interactions that may enhance or undermine the effectiveness of proposed actions were overlooked." (Pg 12)

A specific example of where more details are needed is the removal of groundwater during CM1 dewatering activities, with the intent to discharge into local drainage infrastructure or directly to the rivers and sloughs, resulting in a localized increase in flows and water surface elevations. Only passing reference is made, but few details provided, regarding dispersion facilities being used to reduce the potential for channel erosion due to discharge of dewatering flows.

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[14] See, e.g.,: 1) September 30, 2015, *Review of the Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (California WaterFix)* conducted by Delta Independent Science Board; 2) National Academy of Science Panel to Review California's Draft Bay Delta Conservation Plan, 2011, *A Review of the Use of Science and Adaptive Management in California's Draft Bay Delta Conservation Plan* ("The lack of an appropriate structure creates the impression that the entire effort is little more than a post-hoc rationalization of a previously selected group of facilities, including an isolated conveyance facility, and other measures for achieving goals and objectives that are not clearly specified.") http://www.nap.edu/openbook.php?record_id=13148; 3) Delta Independent Science Board, *Review of the Draft EIR/EIS for the Bay Delta Conservation Plan* (May 15, 2014), . ("The DEIR/DEIS provides an exhausting wealth of information about the Delta and the likely impacts of the proposed alternatives. However, this wealth of information and data is not organized in a way that can usefully inform difficult public and policy discussions.") http://deltacouncil.ca.gov/sites/default/files/documents/files/Item_9_Attachment_3.pdf.

Knowing the dewatering discharge amounts and velocities is critical for the reclamation districts to determine if the design or dispersal facilities being proposed by BDCP will be effective in reducing the level of adverse impacts. We are extremely concerned by the repeated assumptions throughout all EIR/EIS chapters we reviewed that all the mitigation measures will be fully implemented and will in fact work, without any supporting evidentiary in the record.

The analysis should also discuss well-known prior seepage and levee boil impacts from fairly recent inundation of Prospect Island and subsequent landowner lawsuits against the USBR,[15] or how Liberty Island levees quickly deteriorated and crumbled when they were not immediately fixed after a breach.

The following Alt. 4/4A mitigation habitat activities were not analyzed as adverse effects on flood control, but will significantly increase RD costs and create regulatory compliance problems for levee maintenance and island drainage:

- "increase burrow availability for for burrow-dependent species"
- "planting elderberry shrubs in high-density clusters"
- "site valley elderberry longhorn beetle habitat restoration within drainages"

Currently, CM1 as proposed will require the three new North Delta intakes to undergo some operational fish screen testing prior to full pumping – but only *after* all three North Delta diversions have been built. If these never-before-used screens do not function as planned, then this gamble will end up a losing proposition for the Delta fisheries, Delta-as-Place, or CVP/SWP Delta water contractors (who will be stuck with long-term payments on a very expensive stranded asset).

It is important to point out a fact that is rarely discussed in BDCP/WaterFix alternatives – SIZE matters. The average size of the Delta's agricultural water diversion intakes is about 12 inches with a 10-15 cfs capacity (mostly siphon, not pumps) while the urban intakes are less than 300 cfs. The precedent for the size selected for CM1 is the Glenn-Colusa Irrigation District's (GCID) 3,000 cfs intake. However, GCID's facilities are not located in a tidal estuary, do not have to screen for smelt, and were not without their own problems.[16]

To reduce the level of adverse impacts, the preferred alternative (4/4A) should be modified to either delay CEQA/NEPA analysis until the project is at a 60% design level, or require phasing of construction for the intakes and two main tunnels. To address uncertainties, the original the Peripheral Canal conveyance project approved by the State Legislature in 1980 (SB 200 and ACA 90), required the intakes to be installed one at a time and environmental impacts analyzed for two years before proceeding with further construction. The extreme amount of risk warrants a similar phased construction approach so that the altered Delta hydraulic and surface water elevation changes to flood protection, and local water supply and quality can be analyzed and mitigated before building the other intakes/tunnel. Governor Jerry Brown's Administration obviously agreed to this precautionary approach the first time around and should do no less with CA WaterFix.

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[15] See, e.g., *Islands, Inc. V. U.S. Bureau Of Reclam., Dept. Interior* 64 F.Supp.2d 966 (1999)

[16] These problems ultimately resulted in a very expensive redesign of fish screens and forebay. See chronology in *U.S.A. v. Glenn-Colusa Irrigation District* CVS-91-1074-DFL-JFM (1991)

C. Overly Optimistic CEQA/NEPA Impact Conclusions and Mitigations

CEQA conclusions lack credibility because they are typically general and vague in making optimistic assumptions without site-specific identification of where, for how long impacts will occur, or who will be impacted. Will reclamation district have increased pumping costs due to additional discharges by BDCP activities? Will there still be sufficient capacity for adjacent landowners to discharge their drainage? Will BDCP's use of local drainage facilities require approval or permitting by owners/operators of the drainage system?

The RDEIR/SDEIS fails to specify the scientific background on how these assumptions were made. Where are these assumptions anticipated to occur? Are these impacts anticipated to occur more frequently than existing conditions? If so, how much more often and when?

The Delta ISB had the following to say about the "unwarranted optimism" that continues to persist in CA WaterFix:

- "The level of certainty seems optimistic, and it is unclear whether there are any contingency plans in case things don't work out as planned. This problem persists from the Previous Draft." (Pg 17)
- "Here, as in many other places, measures are assumed to function as planned, with no evidence to support the assumptions." (Pg 17)
- "This conclusion is built on questionable assumptions;" (Pg 8)
- "A scientific basis for this statement is lacking, and an adaptive or risk-based management framework is not offered for the likely event that such optimism is unfulfilled." (Pg 10)
- "The literature does not support this assumption." (Pg 18)

D. Deferral of Analysis and Mitigation

In order to approve a project, the lead agencies must identify feasible mitigation measures or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project.[17] The mitigation measures must also be specific and mandatory, such that they are fully enforceable.

The EIR/EIS cannot defer the determination of the scope and nature of significant impacts until future studies and reports are prepared without including specific performance standards, timeframes for completion, and a commitment to mitigate. However, many Alt. 4/4A Mitigation Measures fail to set specific performance standards or criteria for surveying, relocating, repairing, replacing, compensating, or restoring the impacted resource.

Misleading conclusions and missing impacts associated with Alt 4A that would affect flood management adversely are common throughout the EIR/EIS, mostly because studies about the existing baseline conditions and the Project's impacts are deferred to a later time

[17] Cal. Pub. Res. Code § 21002

The amount of environmental analysis that is deferred to a later date identified by the Delta ISB is concerning to CCVFCA:

- "It defers essential material to the Final EIR/EIS" (09-3-15 cover letter)
- "overall incompleteness through deferral of content to the Final EIR/EIS" (Pg 4)
- "modeling of the effects of levee failure would be presented in the Final Report." (Pg 4)
- "The Current Draft does not demonstrate consideration of recently available climate science, and it defers to the Final Report analysis of future system operations under potential climate and sea-level conditions." (Pg 11)

The Association contends that when it comes to flood control impacts, it is reckless to assume that the details of mitigation will be fleshed out at an unknown future date.

Finally, because CA WaterFix alternatives/project is still at a preliminary conceptual level, the Draft EIR/S inappropriately bifurcates the proposed project from disclosing legally required mitigation actions that are likely to be required once the Project reaches a 60% design level and submits a 408 permit application to the U.S. Army Corps of Engineers (USACE). This results in an incomplete picture of the environmental impacts for the decision maker to evaluate.

Section 408 requires permission whenever a person or project will "take possession of or make use of for any purpose, or build upon, alter, deface, destroy, move, injure, obstruct by fastening vessels thereto or otherwise, or in any manner whatever impair the usefulness of any sea wall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the United States, or any piece of plant, floating or otherwise, used in the construction of such work under the control of the United States, in whole or in part, for the preservation and improvement of any of its navigable waters or to prevent floods, or as boundary marks, tide gauges, surveying stations, buoys, or other established marks, nor remove for ballast or other purposes any stone or other material composing such works." Because many of the activities in CA WaterFix alternatives involve modification of Project levees (authorized for flood protection or navigational purposes by Congress), section 408 permission will be required.

Under section 408, USACE may grant permission for the encroachment "when in the judgment of [USACE] such occupation or use will not be injurious to the public interest and will not impair the usefulness of such work." In evaluating projects to determine whether they are injurious to the public interest, USACE always looks at the change to the water surface elevation as a result of the project. Where the water surface elevation increases by even a tenth of a foot, USACE requires that the impact be mitigated by (i) addition of other projects to lower the water surface elevation (e.g., a setback levee) or (ii) strengthening of the levees impacted by the rise in water. Each of these means that if there is a water surface elevation increase, then there will need to be additional projects to off-set these impacts as required by Federal law.

But the Draft EIR/S fails to identify these specific projects, or the additional environmental impacts associated with their implementation, even though these potential additional projects and impacts are all foreseeable based on actions required in other similar projects such as the new in-river water supply intakes at Freeport and Stockton. For this reason, the Draft EIR/S is inadequate, must be supplemented, and must be recirculated.

E. Inadequate Modeling

The RDEIR/SDEIS retains a number of deficiencies from the BDCP, including the use of flawed models and failure to conduct full model runs for the new CA WaterFix alternatives.

Refer to MBK Engineers' October 25, 2015 Technical Comments on the Bay Delta Conservation Plan/California Water Fix memorandum for more detailed comments on modeling deficiency issues.

The Delta ISB also pointed out the following issues with the modeling:

- "Although sensitivity modeling was used to address the effects of changes in the footprint and other minor changes of the revised project, full model runs were not carried out to assess the overall effects of the specific changes." (Pg 11)
- "Consequently, modeling that would help bracket ranges of uncertainties or (more importantly) assess propagation of uncertainties is still inadequate." (Pg 11)
- "the Current Draft is probably outdated in its information on climate change and sea-level rise." (Pg 11)
- "the failure to consider how climate change and sea-level rise could affect the outcomes of the proposed project is a concern that carries over from our 2014 review and is accentuated by the current drought" (Pg 8)

F. Water Use Disclosure

The restoration of floodplain, tidal wetlands, and other habitat restoration actions anticipated to be implemented through separate permits for CA EcoRestore will require extensive amounts of water, particularly implementation of CM2 to inundate the Yolo Bypass more frequently and for longer duration. According to the BDCP/WaterFix Effects Analysis, CM2 will result in the diversion of approximately 650,000af of Sacramento River water into the Yolo Bypass between November and mid-May through an operable gate with a total capacity of 6,000 cfs in order to benefit fish.

Since CA WaterFix alternatives anticipate implementation of CM2/Yolo Bypass-Fremont Weir project, the current RDEIR/SDEIS should identify the volume of water to be utilized for this related SWP/CVP project, whose water rights will be used to provide that diversion, and how removal of 6,000 cfs upstream of new intakes with affect WaterFix water operations. The CA WaterFix alternative and RDEIR/SDEIS *Water Supply Chapter* should also disclose the impacts to the SWP/CVP contractor water supplies that would presumably be supplying the water from storage needed to inundate the Yolo Bypass for fish.

In addition, the following CA WaterFix operational assumptions disclosed in the DHCCP Conceptual Engineering Report (July 1, 2015) require disclosure and analysis:

- Must be able to deliver up to 9,000 cfs from north Delta intakes at the low water level in the Sacramento River;
- Must be able to deliver 9,000 cfs flow rate 99% of the time;

- Operating volume of the new North Clifton Court Forebay (NCCF) is significantly less than the existing Clifton Court Forebay.

The cumulative effects analysis in the CA WaterFix alternatives and EIR/EIS *Water Supply* Chapter should identify how much water (and whose water) will be used for construction, operation, and ongoing management of CA EcoRestore habitat restoration projects and the BDCP/WaterFix north Delta intake water operations.

G. Scope of Cumulative Impacts is Insufficient

The RDEIR/SDEIS Cumulative Impacts Analysis does not provide any sort of comprehensive discussion or analysis of how impacts associated with CA WaterFix mitigation measures and BDCP conservation measures, or CA EcoRestore projects relate to each other. How other foreseeable projects (e.g., CA EcoRestore, BiOps, CVFPP, etc.) will affect this proposal or how the activities and effects of individual conservation and mitigation measure will react to each other, conflict with other, or complement each other should be disclosed.

The habitat projects and activities being proposed as mitigation for construction of CA WaterFix conveyance facilities and the new water operations combined with the CA EcoRestore projects anticipated in the Plan Area have the potential to create redirected impacts and increased O&M costs for reclamation districts with responsibility for maintaining levees in the Plan Area. In general, higher water levels along a floodway will require taller levees, and changes in the Delta hydrodynamics will require increased armoring of levees to protect against erosion and seepage. Examples of the many cumulative adverse impacts in the Plan Area (Delta) the EIR/EIS should specifically describe, analyze, and quantify include:

- Cumulative impacts to levee stability and Delta flood risk from CM1 pile driving, dewatering lowering groundwater 10-20 feet, sediment loading, 9 cofferdams in the Sacramento River and tributaries, and damage from erosion, seepage, and overtopping;
- Cumulative impacts to Delta agriculture from land conversion, seepage damage, water quality degradation, soil contamination (salinity absorption), blocked access to parcels, and reduce water elevations (surface and groundwater) stranding diversion intakes and wells;
- Cumulative impacts to in-Delta water supply (agriculture and drinking water) from 7 significant and "unavoidable" adverse impacts identified in *Water Quality Chapter 8*.

The failure to adequately analyze the cumulative impacts was also pointed out by the Delta ISB:

- "The proposed project is part of the broader array of management actions in the Delta and should be considered in that broader context." (Pg 18)
- "the Current Draft fails to consider how levee failures would affect the short-term and long-term water operations spelled out in Table 4.1-2." (Pg 7)
- "What are the cumulative impacts of wetland losses in the Delta? What is the tipping point beyond which further wetland losses must be avoided?" (Pg 18)
- "Up to 14 years of construction activities were predicted for some areas (e.g., San Joaquin Co.); this would have cumulative impacts (e.g., dewatering would affect soil

compaction, soil carbon, microbial functions, wildlife populations, and invasive species)." (Pg 19)

H. Adaptive Management, Funding, and Mitigation Commitments are Vague

Under CEQA, an EIR must be sufficiently descriptive and specific to allow the public to clearly understand exactly how significant effects will be mitigated so they can weigh in on the adequacy of such measures. Unfortunately, neither the BDCP nor the CA WaterFix EIR/EIS documents meet CEQA or NEPA requirements in terms of assurances necessary for adaptive management, funding, or mitigation measure commitments.

Fundamental concerns regarding the effectiveness of adaptive management and mitigation measures due to vague descriptions and deferred commitments were noted by the Delta ISB:

- "The lack of substantive treatment of adaptive management in the Current Draft indicates that it is not considered a high priority or the proposer have been unable to develop a substantive idea of how adaptive management would work for the project." (Pg 5)
- "We did not find examples of how adaptive management would be applied to assessing – and finding ways to reduce – the environmental impacts of project construction and operations." (Pg 5)
- "The missing details also include commitments and funding needed for science-based adaptive management and restoration to be developed, and more importantly, to be effective." (Pg 6)
- "The Current Draft does little more than promise that collaborations will occur and that adaptive management will be implemented." (Pg 6)
- "The test will be whether the measures will be undertaken as planned, be as effective as hoped, and continue long enough to fully mitigate effects. This is where adaptive management and having contingency plans in place becomes critically important. It is not apparent that the mitigation plans include these components." (Pg 13)
- "Monitoring is mentioned, but details of organization, intent, and resources seem lacking. Adequate funding to support monitoring, collaborative science, and adaptive management is a chronic problem." (Pg 15)

Finally, environmental conclusions in the RDEIR/SDEIS simply stating that future projects/actions/designs will comply with applicable law does not constitute avoidance of all impacts and does not suffice to replace mitigation. All of the EIR/EIS Chapters we reviewed also had many examples where the adverse impacts identified in the title and description were left unmitigated in the CEQA Conclusion.

VII. COORDINATION WITH FLOOD MANAGEMENT AGENCIES, PLANNING EFFORTS, AND DELTA PROTECTION LAWS

A. Central Valley Flood Protection Plan Coordination and Compliance

To safeguard at-risk people, properties and communities, the State of California holds the responsibility for a system of levees, weirs, bypasses and other risk-management facilities.

Collectively, these State-federal flood protection works –as well as their associated lands, programs, conditions, and mode of operations and maintenance – make up the State Plan of Flood Control (SPFC).[18] The SPFC system and local Delta levees provide flood protection during major storms to over 2 million people in 14 counties and an estimated $70 billion worth of urban and agricultural development.

According to the National Oceanic and Atmospheric Association, every year floods cause an estimated $2 billion in property damage, and California's Central Valley has been identified in one of the nation's highest risk categories. California voters approved more than $4 billion in bond money for flood infrastructure after Hurricane Katrina raised public awareness to the dangers of levee failures, allowing state and local partnerships to diligently improve the level of flood protection in the Sacramento and San Joaquin River watersheds.

The BDCP indicates several portions of the SPFC facilities will be removed, built on, vegetated, inundated, moved, or breached in order to construct new SWP water conveyance facilities and restore habitat as project mitigation. However, the BDCP/WaterFix alternatives fail to describe how the BDCP/WaterFix actions will either complement or conflict with the hundreds of flood protection projects identified in Regional Plans developed as part of the Central Valley Flood Protection Plan. These are costly omissions if BDCP/WaterFix preferred alternatives increase Sate's liability exposure or conflict with flood investments identified during CVFPP implementation.

There are also ongoing cooperative flood control projects within the Plan Area in various phases of funding and implementation coordination between the USACE, CVFPB, and local RDs. Yet, the public and decision makers are not informed of this or told how BDCP/WaterFix will ultimately integrate projects slated for the same or adjacent levee locations.

B. USACE PL 84-99 Requirements, Including Levee Vegetation Policies

Many of the individual actions contained in the BDCP's habitat conservation measures and CA WaterFix mitigation measures propose planting "riparian" vegetation to benefit aquatic and terrestrial species, including modification of channel geometry to accommodate new riparian habitats on the water side of levees to improve conditions along salmon migration routes.

The Army Corps has "minimum" standards for maintaining vegetation-free buffer zones on all SPFC Project Levees, but fails to analyze the "feasibility" of vegetating project levees or the possibility that these mitigation mesures cannot be achieved due to conflicts with the Army Corps' levee vegetation policies..

CA WaterFix habitat mitigation measures must be carefully designed to avoid encroachment onto Project levees and not assume that the vegetation objective of BDCP/WaterFix habitat proposals can be accommodated during the USACE's 408 permitting process.

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[18] A complete description of these assets and resources has been compiled by DWR into the *State Plan of Flood Control Descriptive Document,* available at http://www.water.ca.gov/cvfmp/docs/DRAFT_SPFC_Descriptive_Doc_20100115.pdf

DWR should coordinate with the CVFPB to develop an appropriate strategy for how the BDCP/WaterFix modifications of the SPFC project levees will ensure compliance with USACE's PL 84-99 and other conditions contained in the 1953 MOU between CVFPB and USACE. Mitigation measures should include payment of all levee repair/rehabilitation costs for any project or non-project levees in the USACE RIP (PL 84-99) program that will have vegetation plantings pursuant to implementation of BDCP/WaterFix alternatives.

Finally, the Association recommends DWR immediately engage with the CVFPB and local RDs to execute binding agreements (MOU) for SWP/CVP's funding of the ongoing maintenance of all new vegetation within the footprint of a flood control easement. MOU should consider requiring vegetation management commitment by DWR to: 1) maintain the safety, functionality, and structural integrity of the flood facility; 2) ensure accessibility for surveillance, monitoring, inspection, maintenance, and flood-fighting is retained; 3) conduct periodic clearing of some types of vegetation; and submit annual updates to CVFPB on levee vegetation management with particular attention to any instances where maintenance is falling behind and affecting the reliability of SPFC flood control structures.

C. CVFPB Encroachment Permit

Under California law, no modification to the federal/State flood control system (SPFC), encroachment, or project may be constructed on or near the Sacramento and San Joaquin Rivers or their tributaries without the explicit approval of the Central Valley Flood Protection Board. Recent legislation has increased the board's encroachment enforcement authority to remove such encroachments if necessary.

The construction description for CM1 water conveyance facilities indicates numerous work areas and activities that are planned on or near flood control facilities in the Board's jurisdiction, including roads and highways that have SPFC project levees underneath that are to be moved, blocked, driven on in excess of current conditions or have construction equipment staged on or next to the levee.

A commitment to enter into binding agreements (MOU) with the CVFPB and Local Maintaining Agencies/RDs should be inserted as a condition of the Project permits to memorialize how staging of construction equipment, construction traffic, and/or road re-routing will occur and negotiate permit conditions prior to any construction activities. The MOU should also require development of a floodfighting and evacuation plan, provide funding to RD for increased levee maintenance and drainage costs, a levee maintenance schedule, and other mitigation measures necessary to ensure the reliability of the flood protection infrastructure to perform in a high water event.

D. Compliance with Delta Statutes

Changes to the BDCP/WaterFix project require additional disclosures explaining how compliance with various Delta statutes has changed. For instance, the 2009 Delta Reform Act (Water Code §85320(b)) declares that the BDCP (which includes CA WaterFix alternatives) is not eligible for state funding if project analysis fails to:

- Comply with CA NCCP laws;
- Include a reasonable range of flow criteria, rates of diversion, or identify the remaining water available for export;
- Include a reasonable range of alternatives;
- Include potential effects of climate change, possible sea level rise up to 55 inches, and possible changes in total precipitation and runoff patterns on the conveyance alternatives and habitat restoration activities;
- Include the potential effects on Sacramento and San Joaquin River flood management;
- Describe the resilience and recovery of conveyance alternatives in the event of catastrophic loss from flood, earthquake, or other natural disaster.

In addition the Delta Reform Act established several other standards that BDCP/WaterFix should describe, including but not limited to:

- Cannot be incorporated into the Delta Plan unless the project is approved as a HCP/NCCP (WC§ 85320(e));
- Must include a transparent, real-time operational decision-making process to ensure biological performance measures area achieved (WC§85321);
- Requires any SWP/CVP change in the point of diversion order to include appropriate Delta flow criteria and to reimburse SWRCB for costs (WC§ 85086);
- Prohibits commencement of construction for any diversion, conveyance, or other facility until the SWRCB issues an order approving a change in point of diversion for SWP/CVP (WC§85088);
- Prohibits construction of new Delta conveyance facilities until contracts from persons/entities to receive water from SWP/CVP have been entered into to pay for the costs of environmental review, planning, design, construction, and mitigation of new conveyance facilities (WC§85089).

The Delta ISB 2015 Review suggested, "more details on the governance operations (such as the Real Time Operations process) would be useful."

VIII. ECONOMIC ANALYSIS AND FISCAL ASSURANCES

A. Conduct Comprehensive and Unbiased Economic Evaluation of BDCP

To be credible, DWR should undertake objective and comprehensive cost-benefit and socioeconomic analyses. The new effort must be consistent with government economic analysis standards for public water projects;[19]and independently peer-reviewed for accuracy and efficacy of the methodology, assumptions, models, and results.

DWR's Economic Analysis Guidebook specifically states: "DWR should also broaden the economic analysis to include regional economic development (RED) or other social effects

[19] "Economics and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" (P&G) and the "Department of Water Resources Economic Analysis Guidebook."

(OSE) accounts, which can significantly assist in the decision-making process. The RED account is particularly important if a proposed plan will have significantly different effects upon regions that might otherwise be irrelevant to the NED national perspective." As described in comments herein, the BDCP/WaterFix alternatives certainly represent different benefits and impacts between Northern and Southern California, which should be accounted for as RED or OSE – but is not accounted for in this way.

A new, more comprehensive cost-benefit analysis should analyze the costs of such things as:

- The Mitigation Monitoring Plan, including the hundreds of individual actions called for in the *Avoidance and Minimization Measures* (Plan Appendix 3.C);

- The Monitoring and Adaptive Management Program;
- Management contingency assumptions;
- Payment of in-lieu property assessments for lands associated with CM1 (Water Code § 85089(b)) and for mitigation lands transferred from private to public property in the Plan Area.
- Redirected improvement and O&M costs for flood control infrastructure impacted by implementation of BDCP conveyance and habitat restoration projects.

A significant potential fiscal impact that should specifically be addressed in a new economic analysis is the State's exposure, both DWR and CVFPB, to tort liability related to CA WaterFix construction and operation of facilities on SPFC project levees.

Inverse condemnation liability gives private individuals a pathway to recover for disproportionate damages caused by public improvements projects.[20] After the 1986 storms and subsequent levee failures, a lawsuit involving some 3,000 plaintiffs claiming damages from a SPFC Project levee failure which resulted in evacuations, deaths, and hundreds of millions of property damage was filed against the State (*Paterno v. State of California*).[21]

Key factors in assessing the "reasonableness" of the risk inherent to the state's levee project included the large size of the project, the lack of direct benefit to the plaintiffs from the project, the feasibility of alternatives, and the fact that the state benefitted as a whole from the decision not to fund the levee improvements that would have prevented the breach,[22] with foreseeability a supplemental issue considered.

The appellate decision also cited case law stating that a public entity is a proper defendant in an action for inverse condemnation if the entity "substantially participated in the planning, approval, construction, or operation of a public project or improvement that proximately caused injury to private property. So long as the plaintiffs can show substantial participation, it is immaterial 'which sovereign hold title or has the responsibility for operation of the project.'"[23]

In the case of CA WaterFix, the purpose of this project is increasing water supply in export Service Areas, so there are no direct benefits to residents in the Delta that pay assessments for levee maintenance and improvements. In addition, many of the project components propose a

[20] *Locklin v. City of Lafayette*, (1994) 7 Cal.4th 327 at 367
[21] *Paterno v. State of California*, (2003) 113 Cal. App. 4th 998; 6 Cal.Rptr.3d 854 (2004)
[22] *Id.* at 1017; Locklin, 7 Cal 4th at 368-369.
[23] *Paterno*, citing *Arreola,* 99 Cal.App.4th at p. 761

substantial amount of moving, modifying, or building on SPFC levees, so meets the large size criteria. However, CA WaterFix fails to include feasible alternatives to maintain or improve flood protection, such as cost-sharing in the funding of ongoing maintenance and improvement of levees needed for all BDCP/WaterFix alternatives that rely on dual conveyance with a path towards the South Delta pumps. The Association and many others, including the Delta ISB, have recommended BDCP/WaterFix include maintenance of levees as a critical project component.

In 2003, the State of California settled the case for $467 million after the Third Appellate Court concluded in an appeal of the inverse condemnation lawsuit that the State was liable as the party responsible for the SRFCP facilities. The court agreed that the *Paterno* plaintiffs' damages were "directly caused by an unreasonable State plan which resulted in the failure" of the levee, therefore finding the State liable to pay for these damages.[24] Therefore, the significant financial exposure to the State (DWR/CVFPB) from liability should be disclosed and analyzed in a new, more comprehensive economic analysis.

B. Redirected Financial Burdens Not Analyzed or Mitigated

Neither the Plan's finance chapter nor the EIR/EIS provide any sort of cost analysis of the annual budgets for Reclamation Districts in the Delta in order to evaluate the fiscal ability of districts to weather redirected financial impacts from BDCP/WaterFix actions affecting their revenues and operating budgets.

For instance, changes to channel hydrodynamics and flows as well as water elevations and volumes, as proposed in many of the CM1 mitigation measures could create additional costs to reclamation districts from erosion and seepage damage that may require additional rocking, large land-side berms, or other levee improvements to mitigate the impacts. At the very least, seepage monitoring will need to be installed and addressed in locations surrounding new aquatic habitat areas, which adds to the projects costs not analyzed in the BDCP/WaterFix economic analysis.

Finally, the reclamation and levee districts that operate and maintain most flood protection and control infrastructure in the Delta rely on the local assessment roll as their primary direct funding source, and it would be highly inequitable to leave them to protect new levee improvements or higher maintenance costs associated with CM1 construction, operation, and mitigation actions. CCVFCA requests a mitigation measure be added requiring DWR to pay for all additional O&M or other related district costs (i.e., higher electricity costs for drainage pumping, levee improvements to add freeboard due to sediment increases raising water surface elevations, wave fetch erosion damage from open water/tidal habitat restoration, etc.) incurred by reclamation districts as a result of implementation of any CA WaterFix actions. These costs must have own section and budget line item in the BDCP/WaterFix's Annual Work Plan and Budget.

IX. CONCLUSION

The very preliminary conceptual nature of the BDCP/CA WaterFix project alternatives, results in a failure to assess numerous significant impacts and development of CEQA/NEPA conclusions

[24] *Id.*

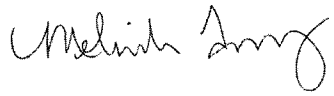
that are primarily based on conjecture. In addition, the environmental and public safety impacts are nearly impossible to decipher due to the disjointed document organization and presentation; and therefore fails to satisfy the most basic requirement of CEQA – to inform the public about the environmental consequences of a proposed decision or project.

As pointed out by the Delta Independent Science Board, the CA WaterFix project alternatives and RDEIR/SDEIS lack completeness, defer essential material to the Final EIR/EIS, and retain a number of deficiencies inherent in the 2014 BDCP DEIR/DEIS.

These limiting factors prevent CCVFCA, its member agencies, and the general public from fully understanding the true scope, severity, and duration of potential environmental and economic effects associated with the construction, permitting, operation, and mitigation of BDCP/WaterFix project components.

The substantial inadequacies of the BDCP/WaterFix alternatives and RDEIR/SDEIS fail to protect people and property in the Plan Area or meet the legal requirements for state and federal endangered species, environmental assessment, or various Delta protection laws. Therefore, the Association requests the State to revise per comments contained herein and once again recirculate the Plan and EIR/EIS for public review and comment.

Respectfully,



Melinda Terry, Executive Director
CA Central Valley Flood Control Association

Review of Bay Delta Conservation Program Modeling

by Daniel B. Steiner, Consulting Engineer and MBK Engineers

Technical Appendix

Contents

Figures

Tables

1 INTRODUCTION

For a little more than a year, Dan Steiner and MBK Engineers (independent analysts) have been responding to questions from stakeholders[1] regarding the Bay Delta Conservation Plan (BDCP). Initially, the independent analysts were asked to review the CalSim II modeling studies performed as part of the BDCP (hereafter "BDCP studies" or "BDCP modeling") to help various parties understand the BDCP Alternatives and their potential implications. Stakeholders requested a review and assessment of the approach undertaken by the BDCP modelers and the results that were derived.

The initial review led the independent analysts to conclude that the BDCP modeling provides very limited useful information to illustrate how the BDCP may affect the Bay-Delta watershed system. To determine the effects of the BDCP, the independent analyst revised the CalSim II model to depict a more accurate version of current and future benchmark hydrology and operations upon which to contrast BDCP Alternatives. Significant effort was given to coordinate with or inform Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR) managers and modeling staff of the independent model modifications, assumptions, and our findings, and at times we used their guidance and direction to refine our analysis.

This technical appendix summarizes: (1) the independent review of the CalSim II modeling publicly released for the BDCP's Draft Environmental Impact Report/Statement (EIRS), (2) the corrections and revisions made to the assumptions in the CalSim II model, and (3) comparisons between the BDCP and independent modeling results. The detailed information in this appendix is summarized in our main report.

[1] The entities who funded this report are Contra Costa Water District, East Bay Municipal Utility District, Friant Water Authority, Northern California Water Association, North Delta Water Agency, San Joaquin River Exchange Contractors Water Authority, San Joaquin Tributaries Authority, and Tehama Colusa Canal Authority.

2 REVIEW OF BDCP CALSIM II MODELING

2.1 Climate Change

Implementation of Climate Change

The analysis presented in the BDCP Documents attempts to incorporate the effects of climate change at two future climate periods: the early long term (ELT) at approximately the year 2025; and the late long term (LLT) at approximately 2060. As described in the BDCP documents[2], other analytical tools were used to determine anticipated changes to precipitation and air temperature that is expected to occur under ELT and LLT conditions. Projected precipitation and temperature was then used to determine how much water is expected to flow into the upstream reservoirs and downstream accretions/depletions over an 82-year period of variable hydrology; these time series were then used as inputs into the CalSim II operations model. A second aspect of climate change, the anticipated amount of sea level rise, is incorporated into the CalSim II model by modifying a subroutine that determines salinity within the Delta based on flows within Delta channels. The effects of sea level rise will manifest as a need for additional outflow when water quality is controlling operations to prevent seawater intrusion.

This report does not review the analytical processes by which reservoir inflows and runoff were developed, nor does it evaluate the modified flow-salinity relationships that are assumed due to sea level rise; those items could be the focus of another independent review. This review is limited to evaluating how the modified flows were incorporated into CalSim II and whether the operation of the CVP and SWP water system in response to the modified flows and the modified flow-salinity relationship is reasonable for the ELT and LLT conditions. This work reviews the assumed underlying hydrology and simulated operation of the CVP/SWP, assumed regulatory requirements, and the resultant water delivery reliability.

CalSim II Assumptions

To assess climate change, the three without Project (or "baseline" or "no action") modeling scenarios were reviewed: No Action Alternative (NAA)[3], No Action Alternative at the Early Long Term (NAA – ELT), and No Action Alternative at the Late Long Term (NAA –LLT). Assumptions for NAA, NAA-ELT, and NAA-LLT are provided in the Draft EIR[4]. The only difference between these scenarios is the climate-related changes made for the ELT and LLT conditions (Table 1).

Table 1. Scenarios used to evaluate climate change

	Climate Change Assumptions	
Scenario	**Hydrology**	**Sea Level Rise**
No Action Alternative (NAA)	None	None
No Action Alternative at Early Long Term (NAA-ELT)	Modified reservoir inflows and runoff for expected conditions at 2025	15 cm
No Action Alternative at Early Long Term (NAA-LLT)	Modified reservoir inflows and runoff for expected conditions at 2060	45 cm

[2] BDCP EIR/EIS Appendix 5A, Section A and BDCP HCP/NCCP Appendix 5.A.2
[3] NAA is also called the Existing Biological Conditions number 2 (EBC-2) in the Draft Plan.
[4] BDCP EIR/EIS Appendix 5A, Section B, Table B-8

The differences between the NAA and NAA-ELT reveal the effects of the climate change assumptions under ELT conditions; similarly, the differences between the NAA and NAA-LLT reveal the effects of the climate change assumptions under LLT conditions.

Regulatory requirements

Each of the no action alternatives assumes the same regulatory requirements, generally representing the existing regulatory environment at the time of study formulation (February 2009), including Stanislaus ROP NFMS BO (June 2009) Actions III.1.2 and III.1.3, Trinity Preferred EIS Alternative, NMFS 2004 Winter-run BO, NMFS BO (June 2009) Action I.2.1, SWRCB WR90-5, CVPIA (b)(2) flows, NMFS BO (June 2009) Action I.2.2, ARFM NMFS BO (June 2009) Action II.1, no SJRRP flow modeled, Vernalis SWRCB D1641 Vernalis flow and WQ and NMFS BO (June 2009) Action IV.2.1, Delta D1641 and NMFS Delta Actions including Fall X2 FWS BO (December 2008) Action 4, Export restrictions including NMFS BO (June 2009) Action IV.11.2v Phase II, OMR FWS BO (December 2008) Actions 1-3 and NMFS BO (June 2009) Action IV.2.3v.

The modeling protocols for the recent USFWS BO (2008) and NMFS BO (2009) have been cited as being cooperatively developed by Reclamation, NMFS, U.S. Fish and Wildlife Service (USF&WS), California Department of Fish and Wildlife (CDF&W), and DWR.

Each of the BDCP no action alternatives (NAA, NAA-ELT, and NAA-LLT) uses the same New Melones Reservoir and other San Joaquin River operations. At the time of these studies' formulation, the National Marine Fisheries Services (NMFS) Biological Opinion (BO) (June 2009) had been recently released. Also, the San Joaquin River Agreement (SJRA, including the Vernalis Adaptive Management Program [VAMP]) and its incorporation into D1641 for Vernalis flow requirements were either still in force or being discussed for extension. As a component of study assumptions, the protocols of the SJRA and an implementation of the NMFS BO for San Joaquin River operations (including New Melones Reservoir operations) is included in the studies. These protocols, in particular the inclusion of VAMP which has now expired, is not appropriate as an assumption within either the No Action or Alternative Scenarios. Although appropriate within the identification of actions, programs and protocols present at the time of the NOI/NOP, they are not representative of current or reasonably foreseeable operations. Also, modeling of the future operation of the Friant Division of the CVP assumes no San Joaquin River Restoration Program releases. While assuming no difference in the current and future operation of the Friant Division avoids another difference in existing and projected future hydrology of the San Joaquin River, the assumption does not recognize the existence of the San Joaquin River Restoration Program. Results of CVP and SWP operations, in particular as affected by export constraints dependent on San Joaquin River flows and their effect on OMR, E/I and I/E diversion constraints, would be different with a different set of assumptions for San Joaquin River operations.

Finally, the habitat restoration requirements in the 2008 FWS BO and the 2009 NMFS BO are not included in the No Action Alternative baselines. Although the restoration is required to be completed either with or without completion of the BDCP, the restoration was only analyzed as part of the with project scenarios.

Model Results

Inflow and Reservoir Storage in the Sacramento River Basin

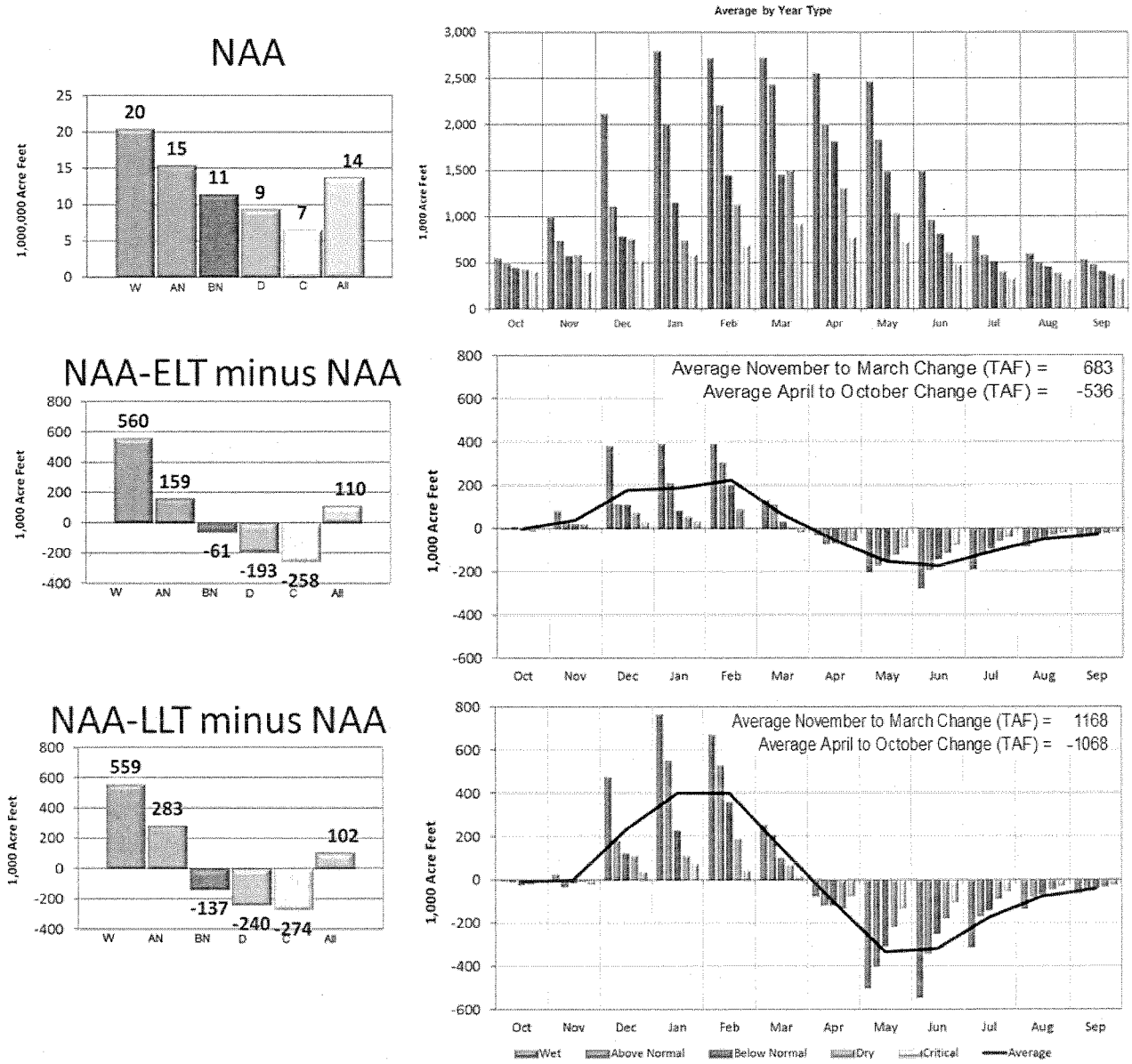
The significance of changed hydrology between the three without project baselines is illustrated in Figure 1 below. The figure illustrates the projected combined inflow of Trinity, Shasta, Oroville, and Folsom Reservoirs under the three NAA baselines. Numerous modeling projections for climate change have been developed, and in this BDCP group of Scenarios Trinity, Shasta, and Oroville inflow are projected to increase overall, but with a

significant shift from spring runoff to winter runoff and increases in wetter years with decreases in dryer years. Folsom Reservoir inflow is projected to remain about the same at the time of the NAA-ELT Scenario but decreases by the time of the NAA-LLT Scenario. The spring to winter shift in runoff is also projected for Folsom Reservoir inflow.

If climate change resulted in such drastic inflow changes, there is argument that certain underlying operating criteria such as instream flow requirements and flood control diagrams would require change in recognition of the changed hydrology. Regarding current environmental flow requirements carried into the NAA Scenarios, we question an assumed operation that continues to attempt to meet temperature targets when flow releases are unlikely to meet the target and thus a sustainable operation plan is not possible. For example, the CVP and SWP are unlikely to draw reservoirs to dead pool as often as the models depict. The NAA-ELT and NAA-LLT model Scenarios show project reservoirs going to dead pool in 10% of years; such operation would result in cutting upstream urban area deliveries below what is needed for public health and safety in 10% of years and would lead to water temperature conditions that would likely not achieve the assumed objectives. Again in short, the Scenarios that include climate change do not provide a reasonable underlying CVP/SWP operation with a changed hydrology from which to impose a Project upon to understand how BDCP Alternatives will affect the water system and water users.

In our opinion, the CalSim II depicted operations that incorporate climate change are not reasonably foreseeable and do not represent a likely future operation of the CVP/SWP. Although an argument is typically made that these study baselines will be used in a comparison analysis with Project Alternatives tiering from these baselines, we believe that the depicted operations do not represent credible CVP/SWP operations and we have no confidence in the results and they are inappropriate as the foundation of a Project Alternative. As such, although the modeling approach may provide a relative comparison between equal foundational operations, we are apprehensive to place much confidence in the computed differences shown between the NAA and Project Alternative Scenarios.

Figure 1. Projected Inflow to Trinity, Shasta, Oroville, and Folsom Reservoirs – NAA, NAA-ELT and NAA-LLT



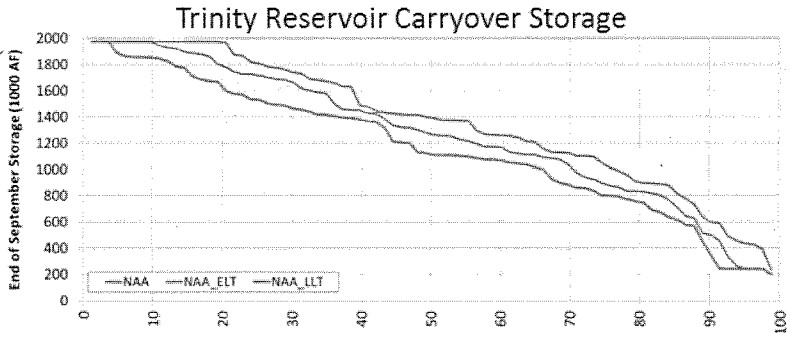
Carryover Storage in the Sacramento River Basin

For upstream CVP and SWP reservoirs the assumed shift of inflows due to climate change (Figure 1) along with a continuing need to satisfy exports demands significantly affects carryover storage. The CVP and SWP simply cannot satisfy water demands and regulatory criteria imposed on them in the NAA-ELT and NAA-LLT modeling scenarios.

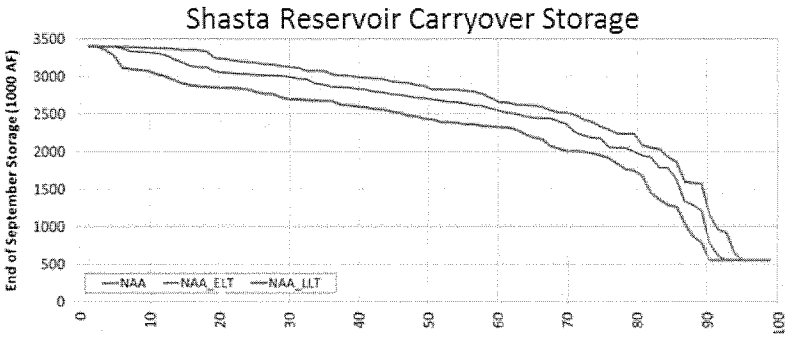
Figure 2 illustrates the typical change in carryover storage as shown for Trinity, Shasta, Oroville, and Folsom Reservoirs. The relatively high frequency (approximately 10% of time) of minimum storage occurring at CVP reservoirs illustrates our questioning of credible operations in the studies.

Figure 2. Projected Shasta Reservoir Carryover Storage, NAA, NAA-ELT and NAA-LLT

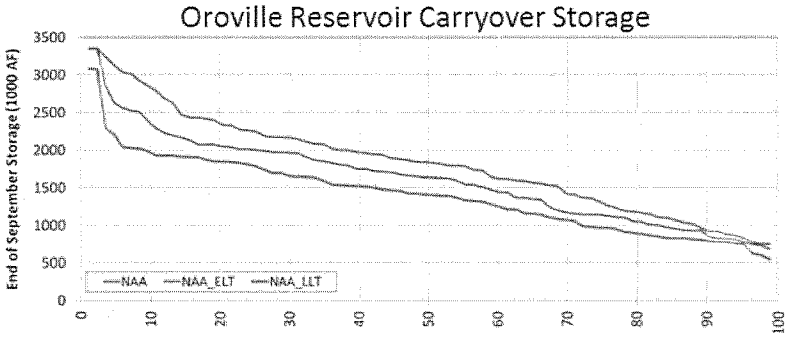
	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Trinity	W	-62	-187
	AN	-79	-198
	BN	-102	-170
	D	-138	-271
	C	-126	-216
	All	-97	-209



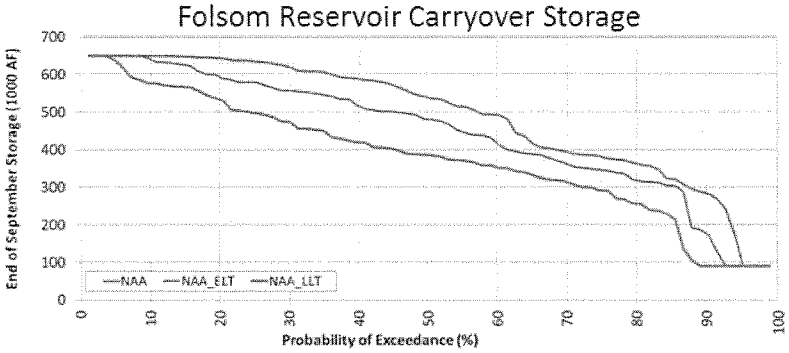
	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Shasta	W	-117	-331
	AN	-199	-452
	BN	-152	-340
	D	-154	-463
	C	-192	-377
	All	-154	-386



	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Oroville	W	-296	-588
	AN	-225	-460
	BN	-229	-513
	D	-180	-296
	C	-54	-159
	All	-213	-430



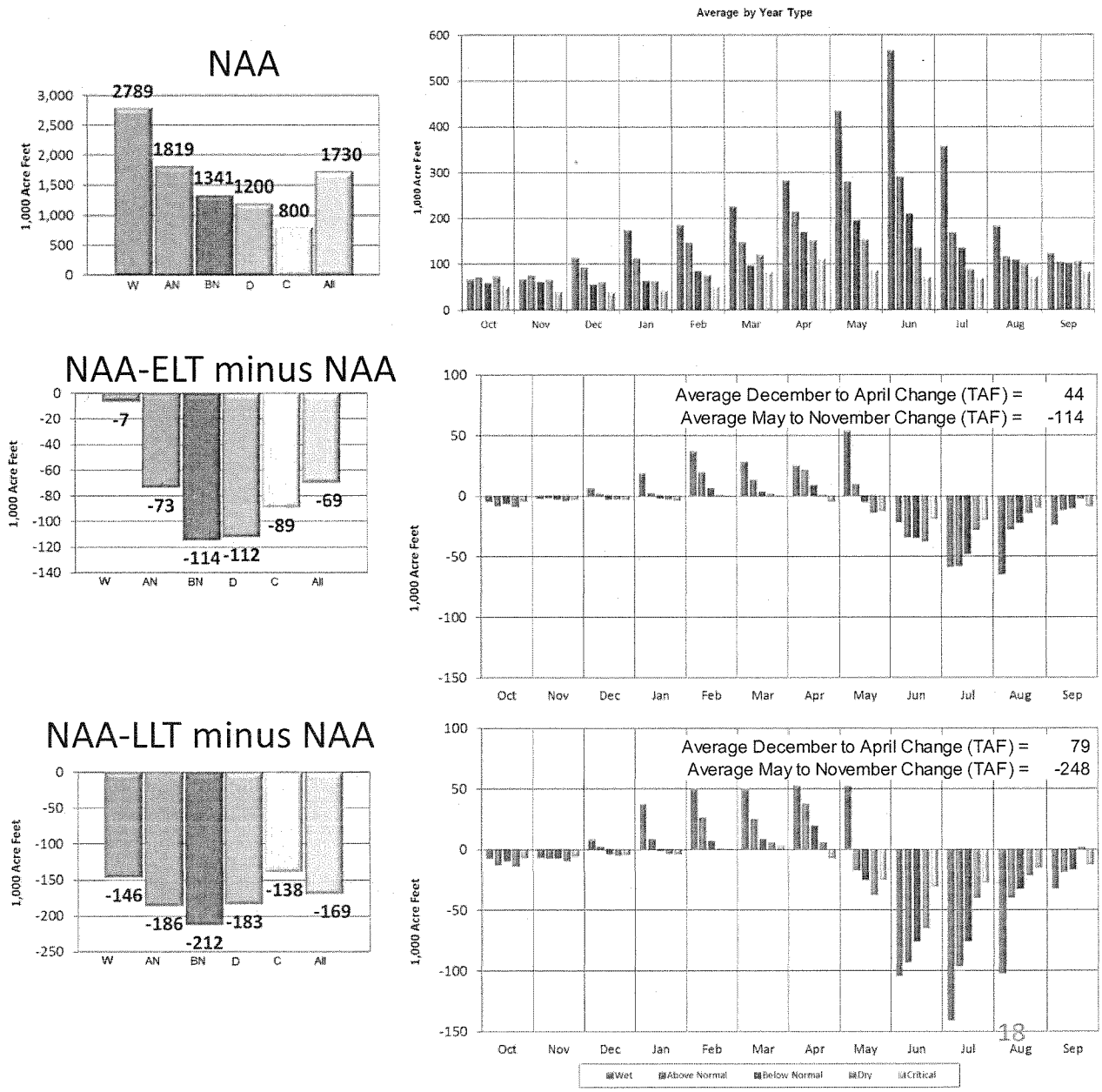
	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Folsom	W	-42	-115
	AN	-54	-128
	BN	-58	-136
	D	-43	-112
	C	-43	-68
	All	-47	-113



Inflow and Carryover Storage in the San Joaquin River Basin

San Joaquin Valley reservoirs are depicted with an overall decrease in annual runoff with some shifting of runoff from spring to winter, but mostly just decreases in spring runoff due to a decline in snowmelt runoff during late spring[5]. Figure 3 illustrates the assumed effects of climate change upon inflow to Millerton Lake.

Figure 3. Projected Inflow to Millerton Lake –NAA, NAA-ELT and NAA-LLT



The hydrology differences imposed in the NAA Scenarios of the Friant Division are described above, and its appropriateness may be subject to additional debate and Alternative assumptions. However, our review found that implementation of Millerton Reservoir inflow as affected by climate change was improperly performed.

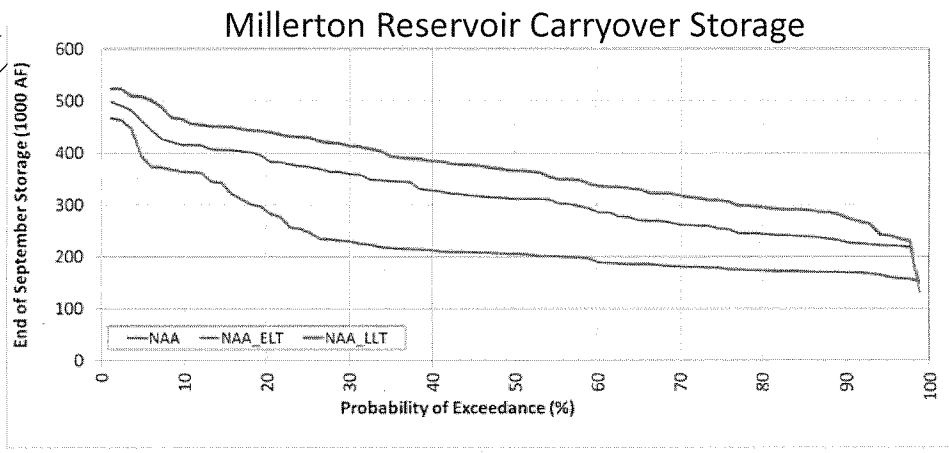
[5] BDCP Appendix 5A.2

Inflow to Millerton Reservoir in this version of CalSim is input in three separate time series for purposes of depicting the hydrology of potential upper basin reservoirs. Climate change hydrology was inconsistently incorporated at Millerton Reservoir and misapplied to the water supply and flood control operations. The result is an unrealistic operation for river releases and canal diversions. Figure 3 illustrates the projected ELT and LLT changes in Millerton Reservoir inflow incorporated in these studies. On face value of the input data, regardless of Friant Dam river release assumptions the effect of climate change at Millerton Lake will affect water deliveries.

Evidence of the inconsistent inflow problem is shown in the result for the comparison of carryover storage of Millerton Reservoir under the NAA, NAA-ELT, and NAA-LLT Scenarios (Figure 4). Carryover storage is higher in the ELT and LLT Scenarios due to climate change effects to inflow incorporated in reservoir operations but not in the computation of water supply deliveries. Thus, water deliveries are suppressed and the reservoir ends the year with greater storage.

Figure 4. Millerton Reservoir Carryover Storage, NAA, NAA-ELT and NAA-LLT Scenarios

	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Millerton	W	56	103
	AN	82	137
	BN	99	161
	D	87	131
	C	131	166
	All	87	136



CVP Water Service Contractor's water allocations are based on available CVP supplies, Figure 5 contains exceedance probability plots of deliveries and allocation percentages to these contractors. Table 2 contains average annual allocation to these CVP Water Service Contractors. Water supplies to these contractors decrease in the ELT and LLT relative to NAA Conditions.

Table 2. CVP Water Service Contractor Allocation Summary

	NAA	NAA-ELT	NAA-LLT
North of Delta Agricultural Service Contractors	61%	53%	46%
South of Delta Agricultural Service Contractors	48%	44%	39%
North of Delta M&I Contractors	85%	81%	77%
South of Delta M&I Contractors	79%	77%	74%

CVP Sacramento River Settlement, San Joaquin River Exchange, and Refuge deliveries are based on Shasta Criteria and are 100% in most years and 75% in "Shasta critical" years[6]. Figure 6 contains exceedance probability charts for annual water deliveries to CVP contractors whose allocations are based on Shasta Criteria. In the NAA-ELT and NAA-LLT modeling scenarios, the Sacramento River Settlement and Refuge deliveries are reduced due to water shortages that occur more often under the climate change assumptions.

SWP Water Supply

Corresponding with the CVP operation is the projected operation of the SWP under No Action Conditions. These illustrations are shown to provide a comparison to SWP storage and exports, particularly during drought. A comparison of SWP exports to CVP SOD deliveries shows that each project exports about the same amount of water during drought.

Average annual SWP Table A water supply allocations are 62% for NAA, 61% for NAA-ELT, and 57% for NAA-LLT. Figure 7 contains an exceedance probability plot summary of SWP deliveries. SWP North of Delta deliveries to the Feather River Service Area in both the ELT and LLT are less than NAA during about 10% of the time.

[6] A "Shasta critical" year is determined when the forecasted full natural inflow into Shasta Lake is equal to or less than 3.2 million acre-feet.

Figure 5. CVP Water Service Contractor Delivery Summary

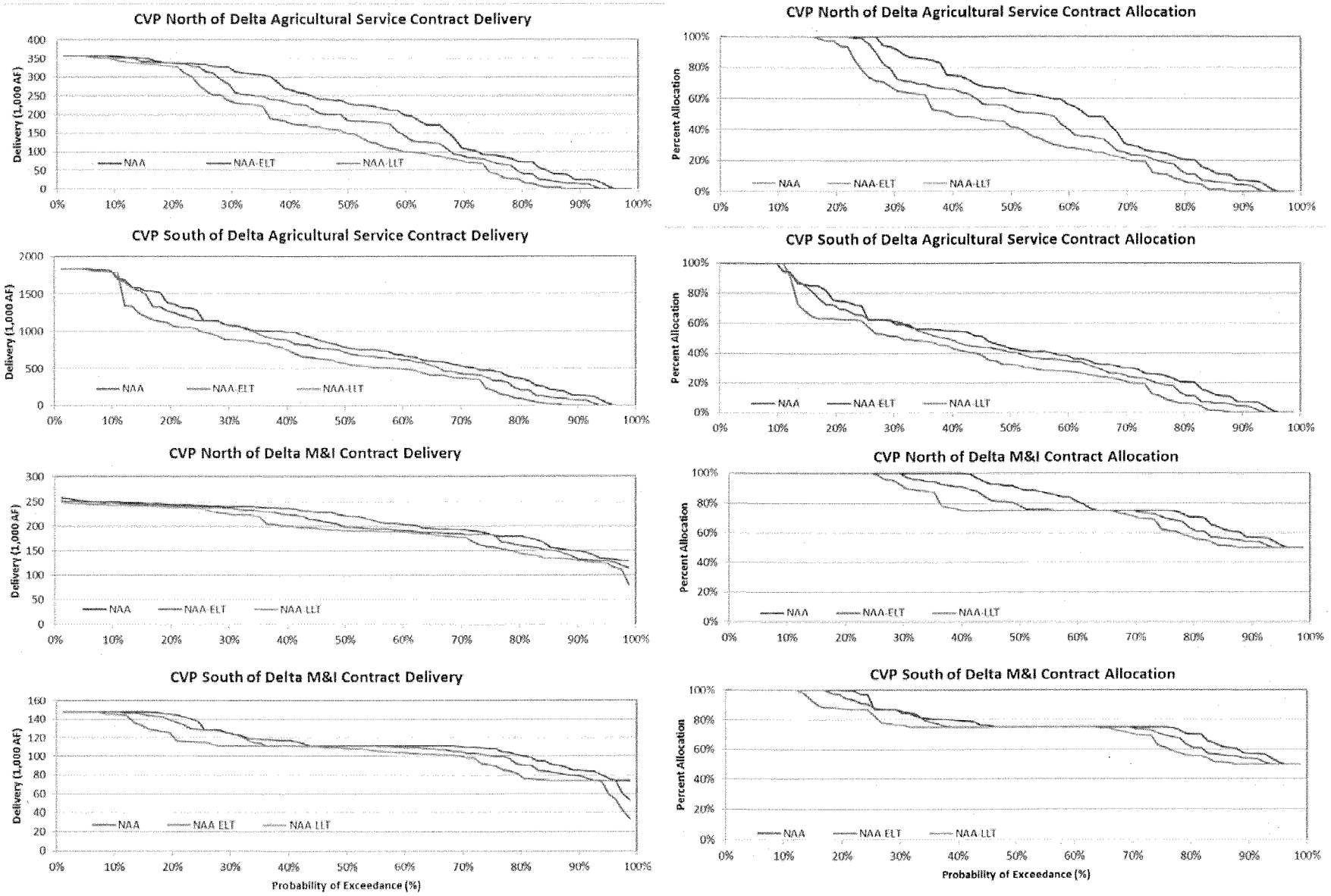


Figure 6. CVP Contractor Delivery Summary for Contractors with Shasta Criteria Allocations

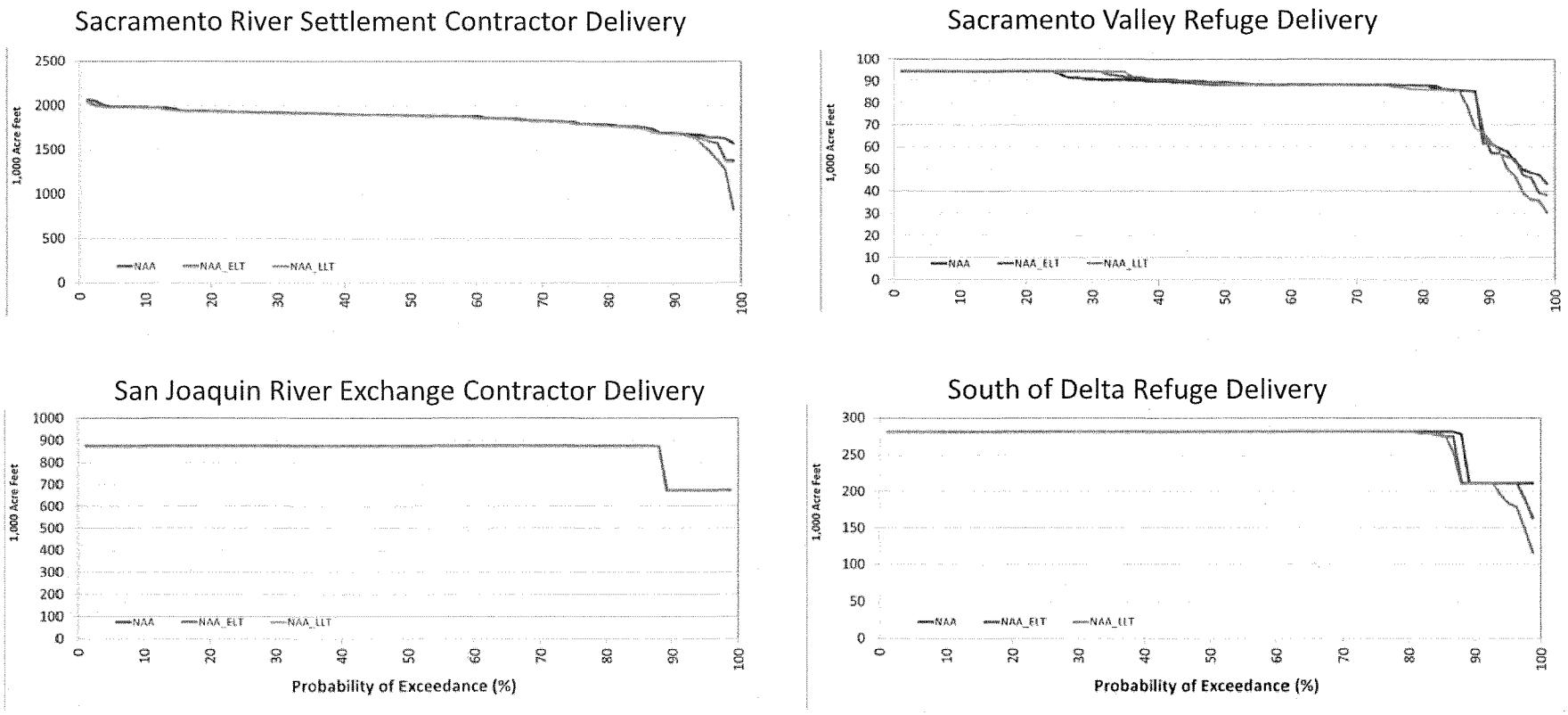
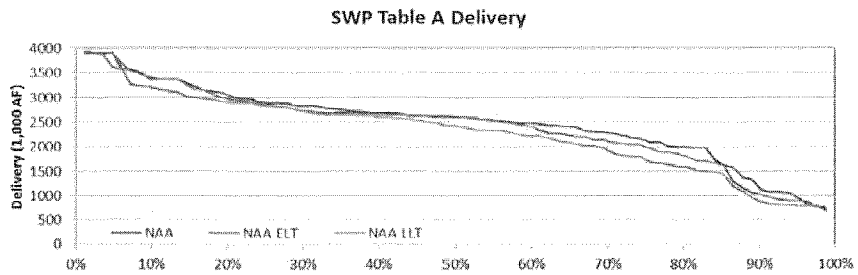
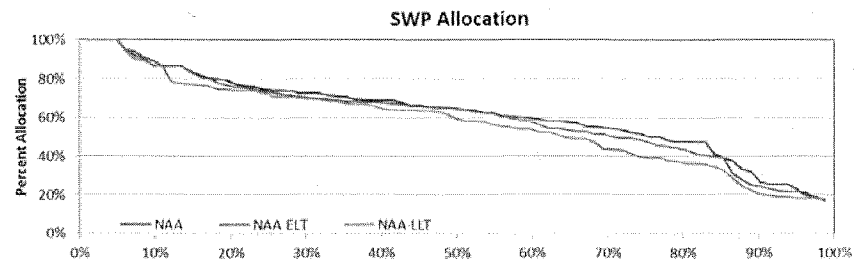
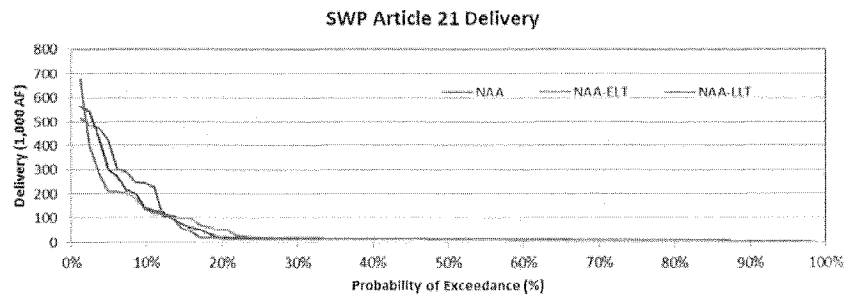
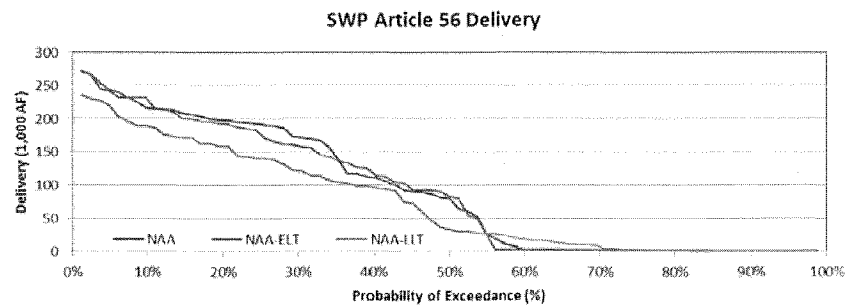


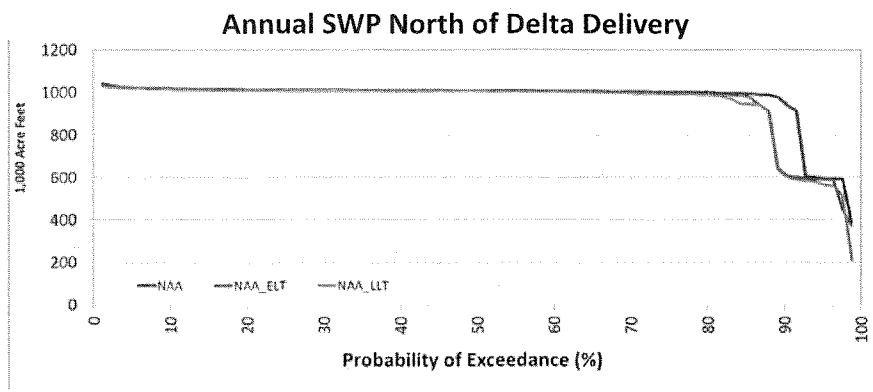
Figure 7. SWP Delta Delivery Summary











CVP/SWP Exports

Exports of the CVP and SWP have been projected to change due to a combination of climate change effects on water availability (primary effect), flow requirements for salinity control (sea level rise), additional in-basin water demands, and to a small extent greater export potential (DMC-CA intertie). Figure 8 illustrates the simulation of CVP exports and combined CVP/SWP exports under NAA, NAA-ELT, and NAA-LLT Scenarios. Under NAA average annual CVP exports are about 2.24 MAF (2.18 at Jones PP) and are about 100 TAF less in the NAA-ELT Scenario and 230 TAF less in the NAA-LLT. Annual average SWP exports are about 2.61 MAF in the NAA and are 68 TAF less in the NAA-ELT and 212 TAF less in the NAA-LLT. Annual average combined CVP/SWP exports are about 4.9 MAF in the NAA modeling (Figure 9) and about 170 TAF and 460 TAF less in the NAA-ELT and NAA-LLT respectively.

Figure 8. CVP Exports at Jones PP, NAA, NAA-ELT and NAA-LLT

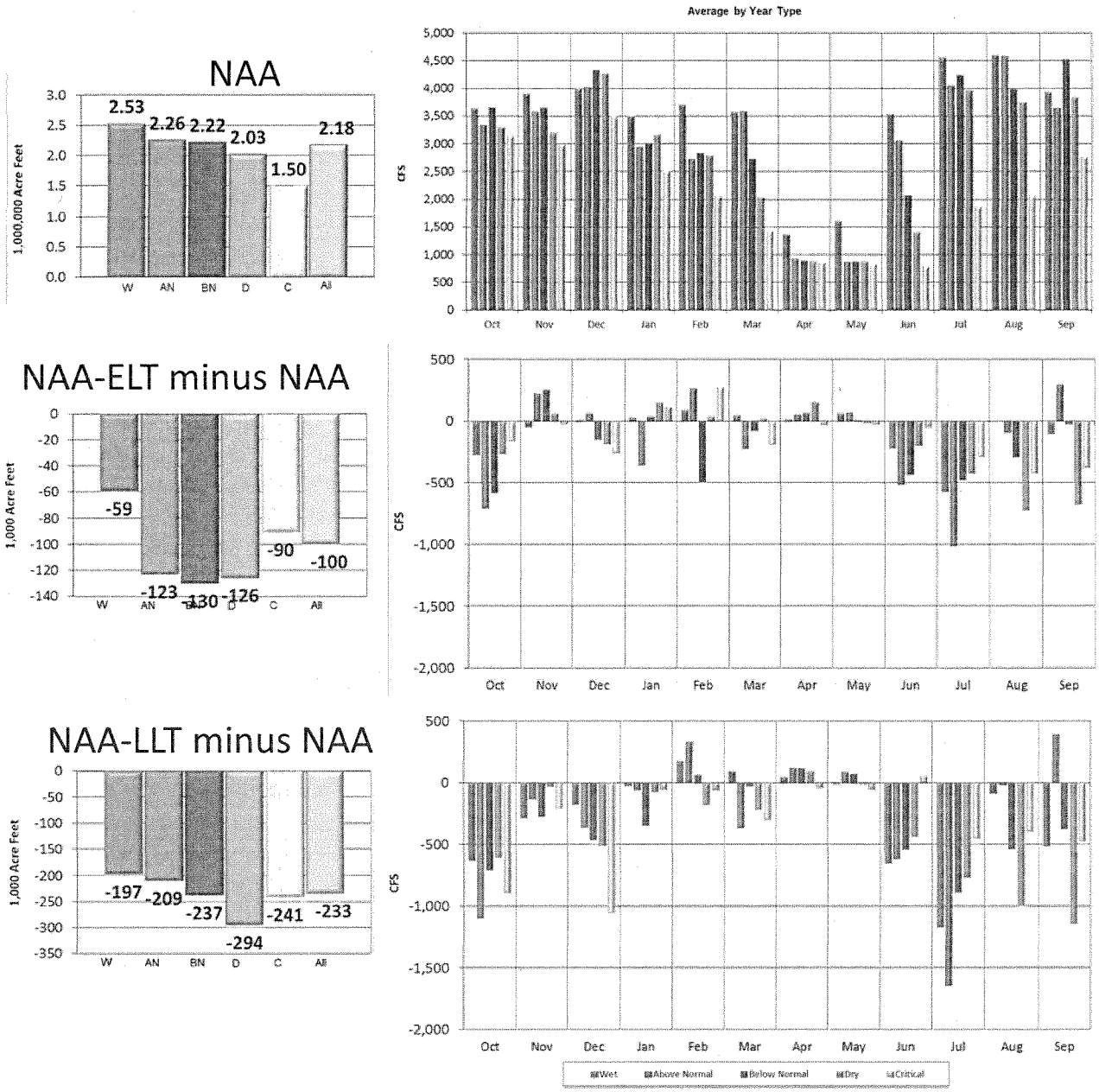
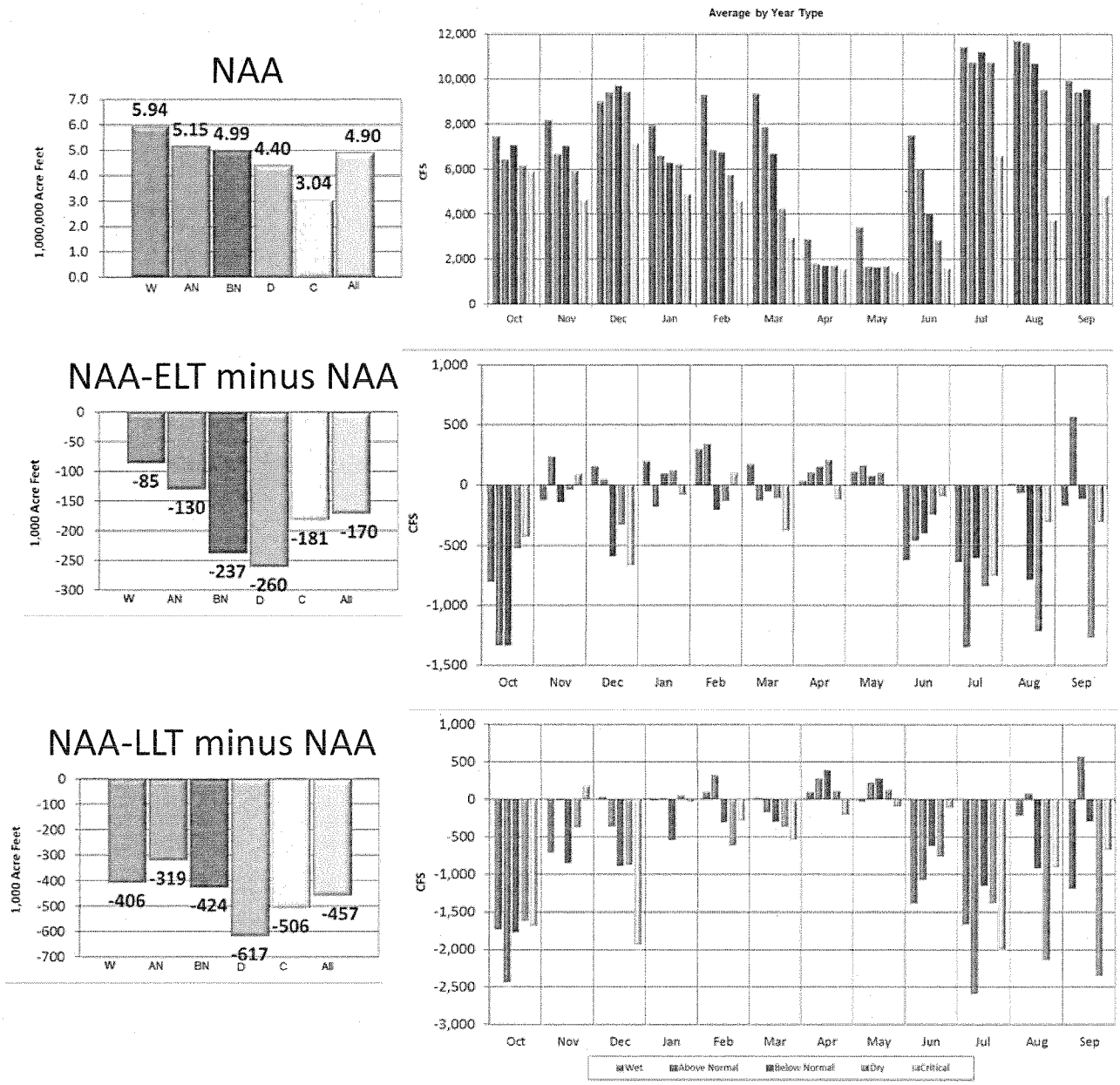


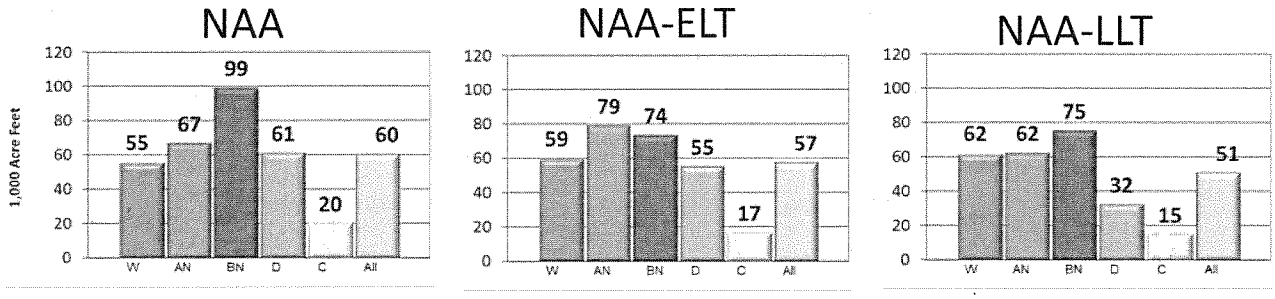
Figure 9. Total CVP/SWP Exports, NAA, NAA-ELT and NAA-LLT



Joint Point of Diversion

The NAA Alternatives do not make use of Joint Point of Diversion (JPOD), however CVP water is pumped at Banks to satisfy the Cross Valley Canal (CVC) contracts. **Figure** 10 shows annual Banks wheeling for CVC for the NAA, NAA-ELT and NAA-LLT.

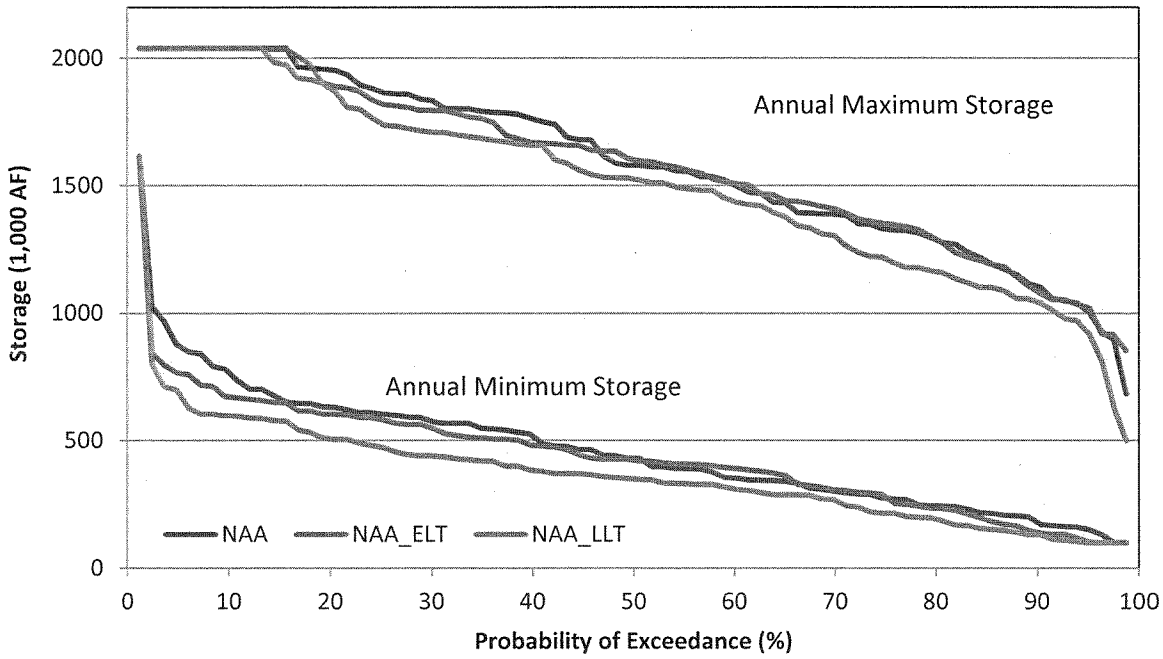
Figure 10. Cross Valley Canal Wheeling at Banks



San Luis Reservoir Operations

Modeling protocols will use San Luis Reservoir to store water when available and provide supply as exports are constrained by hydrology or regulatory constraints. Figure 11 illustrates the projected operation of San Luis Reservoir under the NAA, NAA-ELT, and NAA-LLT Scenarios. The annual maximum storage shows that the ability to fill San Luis Reservoir is somewhat similar for NAA and NAA-ELT but with less ability to fill in the NAA-LLT. The frequency of a low annual low point of San Luis Reservoir is exacerbated in the NAA-LLT Scenario. In all the Scenarios, San Luis Reservoir is heavily exercised. As currently projected, San Luis Reservoir will only fill as the result of very favorable hydrologic conditions including the availability of spill water from Friant or the Kings River system that offsets DMC water demands at the Mendota Pool.

Figure 11. San Luis Reservoir Storage – NAA, NAA-ELT and NAA-LLT



Sacramento River Temperature

CalSim II results, along with meteorological data, are used in temperature models that simulate reservoir temperature and river temperature. The BDCP modeling provided by DWR for review included the Sacramento

River temperature model and results for the No Action and Alternatives. Each BDCP Alternative used temperature target criteria for the upper Sacramento River as is used for the Existing Conditions modeling scenario. Equilibrium temperatures, a calculated model input that approximately depicts the effective air temperature for interaction with water temperature in the model, between Shasta and Gerber are increased by an annual average of 1.6°F for the ELT Scenarios and by 3.3°F for LLT Scenarios. Figure 12 contains monthly exceedance probability charts of temperature at Bend Bridge in the Sacramento River for April through October for the Existing Conditions and NAA-ELT Scenarios. There is about a 1 degree increase in average monthly temperature for the April through October period. Figure 13 contains similar information as Figure 12, but compares modeling results for the NAA-LLT and Existing Conditions Scenarios, there is often a 2°F increase in the NAA-LLT relative to Existing Conditions.

The increase in equilibrium temperatures combined with decreases in storage would lead to water temperature conditions that would likely not achieve the assumed objectives. Figure 12 and Figure 13 illustrate an increase in the probability that a water temperature target of 56°F would be exceeded at Bend Bridge under both the NAA-ELT and NAA-LLT Scenarios. The probability of exceedance increases approximately 5% to 20% depending on the month for the NAA-ELT Scenario and approximately 10% to 40% for the NAA-LLT Scenario.

Figure 12. Temperature Exceedance Sacramento River at Bend Bridge Existing, No Action Alternative, ELT

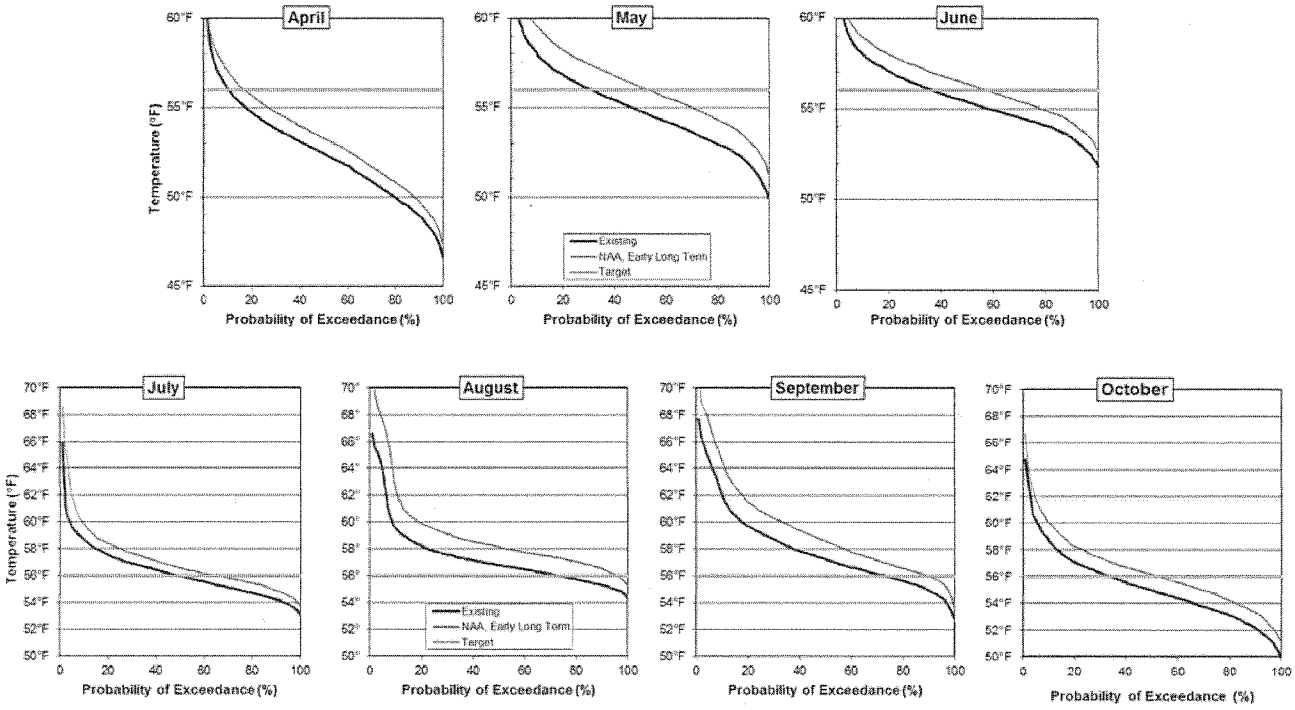
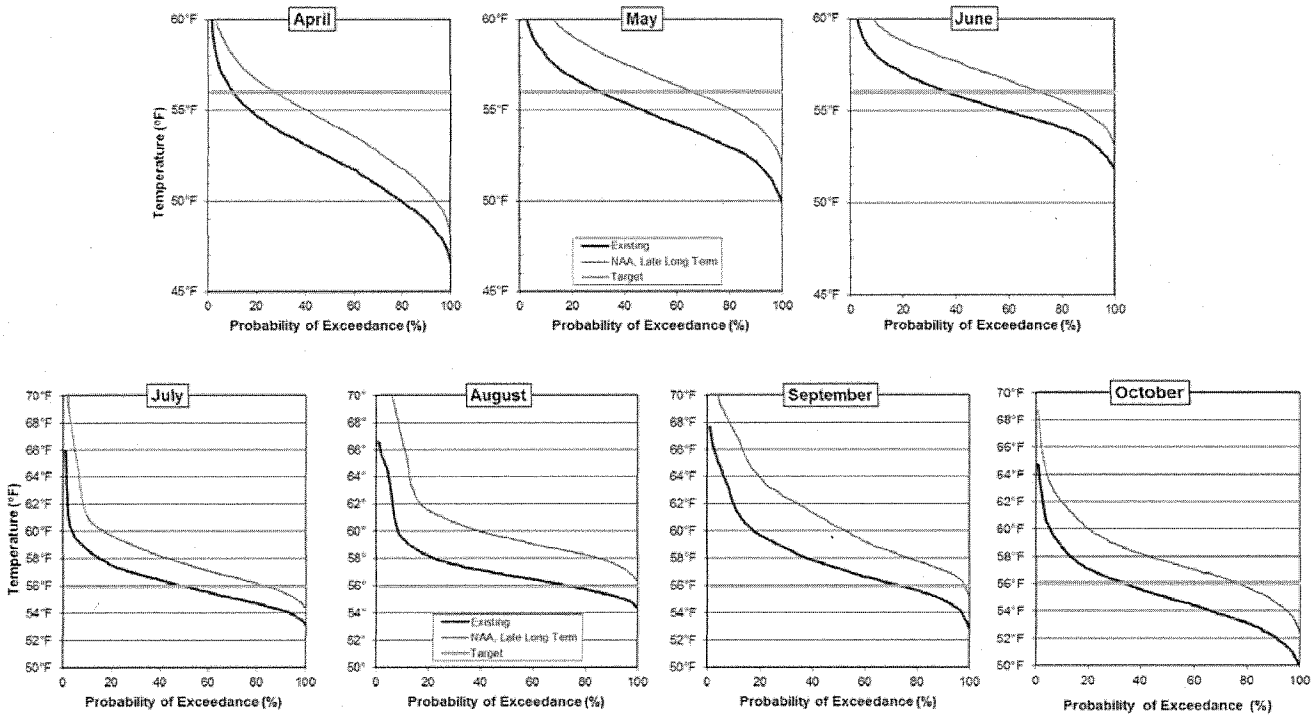


Figure 13. Temperature Exceedance Sacramento River at Bend Bridge Existing, No Action Alternative, LLT



Conclusions regarding Climate Change Assumptions and Implementation

With the predicted changes in precipitation and temperature implemented in the BDCP modeling, there is simply not enough water available to meet all regulatory objectives and water user demands. Yet the BDCP modeling continues to operate the system without any adaptation measures and thus fails to meet its objectives. In this aspect, the BDCP modeling simply does not simulate reality. For instance, if the assumed climate conditions occur in reality the following adaptation measures have been discussed: (1) as precipitation patterns change, operational rules regarding when to release water from reservoirs for flood protection should be updated; (2) during severe droughts, emergency drought declarations could call for mandatory conservation and/or relaxation of regulatory criteria; and (3) if droughts become more frequent, the CVP and SWP would likely revisit the rules by which they allocate water during shortages and operate more conservatively in wetter years. The BDCP modeling is useful in that it reveals hard decisions that must be made. But in the absence of making those decisions, the modeling results themselves are not informative, particularly during drought conditions. When conditions are projected to be so dire without the project, the effects of the project could be obscured simply because conditions cannot get any worse (i.e., storage cannot be reduced below its minimum level).

2.2 BDCP Operation

The next step of our analysis centered on reviewing BDCP modeling of the with project scenarios as described in the December 2013 Draft BDCP and described as Alternative 4 in the Draft EISR.

Description of the BDCP Project

At the time of review, this Alternative was coined Alt 4 and represented a dual conveyance facility. The two DWR analyses reviewed were identified as: