WATER QUALITY MANAGEMENT PLAN
May 24, 2013

Preamble

Delta Wetlands Properties ("DW") proposes a water storage project on four islands in the Sacramento-San Joaquin Delta ("Delta"). The project would involve diverting and storing water on two of the islands (Bacon Island and Webb Tract, or "reservoir islands") and seasonally diverting water to create and enhance wetlands and to manage wildlife habitat on the other two islands (Bouldin Island and Holland Tract, or "habitat islands").

The purpose of the Delta Wetlands Project ("Project") is to divert surplus Delta inflows, for later sale and/or release for Delta export or to meet water quality or flow requirements for the Delta. To operate the Project, DW would strengthen the levees and install additional siphons and water pumps on the perimeters of the reservoir islands. The project will be developed and operated as a partnership between DW and the Semitropic Water Storage District ("Semitropic"). The final Environmental Impact Report was certified by Semitropic in September 2011.

California Urban Water Agencies[1] ("CUWA") and its member agencies have been participating in the public review of the Project since 1997 and are parties to the water rights proceedings for the Project. The primary focus of CUWA's participation in the review of the Project has been to seek a commitment from the Project proponents to minimize and mitigate drinking water quality impacts due to Project operations. Because of the close proximity of the reservoir islands to the Banks Pumping Plant, Tracy Pumping Plant, Contra Costa Canal at Pumping Plant #1, Contra Costa Water District's ("CCWD") Los Vaqueros intake on Old River, Middle River intake on Victoria Canal, and Mallard Slough intake (hereafter "urban intakes"), CUWA is concerned that there is a potential for DW operations to adversely affect drinking water quality.

To address CUWA's water quality concerns, DW will implement a water quality management plan ("WQMP") for the project. The WQMP includes drinking water quality protection principles, an annual operating plan, general operating principles, a comprehensive monitoring program, screening procedures and operational constraints, and mitigation of water quality impacts. Collectively, the elements of the WQMP are intended to provide the urban water utilities with the necessary assurances that the Project will be operated in a manner that will ensure the protection of public health and long-term integrity of drinking water supplies diverted from the Sacramento-San Joaquin Delta. The drinking water constituents that will be addressed by the WQMP are total organic carbon ("TOC"); dissolved organic carbon ("DOC"); bromide; total dissolved solids ("TDS"); chloride; nutrient (nitrogen and phosphorus); and taste and odor compounds, such as 2-methylisoborneol ("MIB") and geosmin; chlorophyll a; algal toxins and problematic algal species typically found in the Delta environment including taste and odor (T&O) producing, filter clogging, and/or toxin-producing algal species. Other constituents of concern may be identified in the future and will be addressed by the WQMP.

[1] All references to CUWA shall mean CUWA, its current member agencies and those member agencies of record as of the date of this agreement.

The WQMP was developed through a negotiated process to resolve issues that are specific to the Project. The terms and conditions of the WQMP are intended to address the potential for injury to senior water rights holders associated with water quality degradation caused by the Project.

The impacts caused by the Project are unique because of its proximity to urban water agencies' intakes and the high rates of discharge from the reservoir islands. The Project, without the protections provided by the WQMP, has the potential to adversely impact human health by increasing disinfection by-products ("DBPs") and to increase the overall cost of water utility operations. The Project could also lead to long-term degradation in drinking water quality. Because the WQMP includes distinctive features that are specific to DW, it should not be construed as setting a precedent that would be applicable to other dissimilar projects subject to State Water Resources Control Board jurisdiction.

A. Drinking Water Quality Protection Principles

The Project will adhere to the drinking water quality protection principles described below through the implementation of the terms and conditions of this WQMP.

1. Project operations shall cause no adverse health impacts to water users;

2. Project operations shall not cause nor contribute to non-compliance with current or future drinking water regulations;

3. Project operations shall cause no increases in the cost of water treatment or operations;

4. Project operations shall contribute to the Delta Reform Act of 2009 (SBX7 1) goal of improving water quality in the Delta to meet drinking water quality goals; and

5. Project operations shall minimize and mitigate for any degradation in the quality of drinking water supplies.

B. Water Quality Management and Action Committee and Annual Operating Plan

The Water Quality Management and Action Committee and the Annual Operating Plan outlined below are intended to support the administration and implementation of the WQMP.

1. Prior to initiating or continuing Project operations, a Water Quality Management and Action Committee ("WQMAC") shall be appointed to oversee the implementation of the WQMP for the Project subject to the procedures, duties and requirements set forth in Attachment 1.

2. DW will propose an Annual Operating Plan for approval by the WQMAC and the State Water Resources Control Board (“SWRCB”) in accordance with the procedures in section 3 below. The Annual Operating Plan will be updated monthly during Project

water storage operations, as necessary and coordinated with Central Valley Project, State Water Project, and CCWD operations. The Annual Operating Plan will include:

a. Schedules and estimated quantities for diversions to the Project islands and discharges from the Project islands.

b. Water quality goals and objectives, including the estimated concentration of TOC, DOC, bromide, chloride, TDS, total nitrogen, total phosphorus, for the diversions to the Project islands and discharges from the Project islands. The estimated concentration of MIB, geosmin, algal toxins and T&O producing, filter clogging and/or toxin-producing algae in the discharges from the Project islands will also be provided.

c. An estimate of the projected change in the concentration of TOC, DOC, bromide, chloride, TDS, total nitrogen, total phosphorus, MIB, geosmin, algal toxins and T&O producing, filter clogging and toxin-producing algae at the urban diversion locations due to scheduled Project operations.

d. Maximum allowable concentrations of the water quality constituents of concern (TOC, DOC, bromide, TDS, chloride, total nitrogen, total phosphorus, MIB, geosmin, algal toxins and T&O producing, filter clogging and/or toxin-producing algae) for water stored on the reservoir islands, above which it will be necessary for DW to pursue remedial actions pursuant to the Emergency Operating Plan. The maximum allowable concentrations are upper limits above which discharge of water from the reservoir islands may cause a violation of one or more of the drinking water quality protection principles.

e. An Emergency Operating Plan describing remedial actions to be taken by DW in the event the water stored on the reservoir islands exceeds the maximum allowable concentrations for the constituents of concern, including a procedure for discharge of the water from the reservoir islands that will minimize the potential for impacts to urban water utilities.

f. A schedule for habitat island operations, including diversion and discharge rates.

g. A schedule for reservoir island operations for non-storage periods.

h. A description of the monitoring program, hydrodynamic models, and particle-tracking models pursuant to Section D.

i. A description of mitigation measures to be implemented by DW to offset any long-term net increase in TOC, DOC, TDS, bromide, chloride, total nitrogen, total phosphorus, MIB, geosmin, algal toxins and T&O producing, filter clogging and/or toxin-producing algae loading pursuant to Section F.

3. DW shall prepare an annual operating plan by September 15 of each year. The annual operating plan shall be submitted to the WQMAC for review and approval and to

CCWD, CUWA, USBR and DWR for review and comment. WQMAC shall comment on and approve or disapprove the annual operating plan and shall provide a report explaining its decision to DW if the WQMAC does not approve an annual operating plan within 30 calendar days. CCWD, CUWA, USBR and DWR shall provide comments to DW within 30 calendar days. DW shall respond to timely comments from WQMAC, CCWD, CUWA, USBR and DWR, and may revise the annual operating plan to respond to comments, within 15 calendar days. Delta Wetlands shall submit the annual operating plan and any comments, WQMAC report, and responses to the SWRCB Deputy Director for Water Rights by November 1 of each year for review, modification and approval. WQMAC may provide its report disapproving an annual operating plan to the SWRCB Deputy Director for Water Rights by November 1 if DW has not revised the annual operating plan to WQMAC's satisfaction. The Division shall also be afforded 30 calendar days for its review. If DW disagrees with any conditions proposed by the WQMAC, DW may submit the basis for disagreement and proposed amended condition language to the Division for consideration. The annual operating plan shall include information on estimated monthly operations, based on coordination with CVP, SWP and CCWD operations.

Failure to timely develop and implement an annual operating plan shall result in the following. If this occurs prior to initiation of the first diversions under the water right permit, no diversion is authorized until an acceptable annual operating plan has been developed. If this occurs in any subsequent year, Delta Wetlands shall operate in accordance with the most recently approved annual operating plan, except that Delta Wetlands shall also implement any supplemental measures deemed necessary by WQMAC unless advised by the Division that the supplemental measures are not required.

The operating plan shall be updated monthly during Project water storage operations, as necessary. The operating plan may be revised based on changed conditions. Any revisions to an approved annual operating plan are subject to the same review and approval process above.

C. General Operating Principles

The general operating principles outlined below are intended to support implementation of the WQMP.

1. To maintain low TOC, DOC, bromide, TDS, chloride, bromide, total nitrogen, total phosphorus, MIB, geosmin, algal toxins and T&O producing, filter clogging and/or toxin-producing algae to the fullest extent practicable, DW will:

    a. Avoid practices that will result in high TOC and DOC productivity during non-storage periods;

    b. Avoid diversions to storage during peak TOC and DOC periods;

    c. Avoid diversions to storage during high bromide and high salinity periods;

d. Avoid diversions to storage during high total nitrogen and phosphorus periods;

e. Manage vegetative growth on the reservoir islands to minimize TOC and DOC production; and

f. Manage algal growth on the reservoir islands to minimize the production of algal toxins and T&O producing, filter clogging and/or toxin- producing algae.

2. To avoid degradation in water quality at the urban intakes in the Delta, DW will develop operational procedures to:

   a. Reduce the rate of discharge from the reservoir islands as appropriate;

   b. Coordinate discharges between reservoir islands;

   c. Adjust discharges for exports in accordance with Delta hydrodynamic conditions (e.g., tides, pulse flows);

   d. Avoid operations that cause concentrations of T&O producing algae to increase at one or more urban intakes; and

   e. Avoid operations that cause biomass of filter-clogging algae to exceed problematic levels at one or more urban intakes.

3. To avoid excessive TOC, TDS, chloride, bromide, total nitrogen, total phosphorus, MIB, and geosmin levels DW will:

   a. Pursue remedial actions or acquire offsets before initiating further diversions to storage if TOC, TDS, chloride, bromide total nitrogen, total phosphorus, MIB, geosmin, algal toxins and T&O producing, filter clogging and/or toxin-producing algae concentrations on reservoir islands regularly exceed 80% of the maximum allowable concentrations set forth in the Annual Operating Plan.

D. Comprehensive Monitoring Program

The comprehensive monitoring program outlined below will be developed and in place prior to initiating Project operations. The monitoring program provides for the collection of data to support the screening of Project operations and for imposition of operational constraints pursuant to Section E and the identification of mitigation requirements pursuant to Section F.

1. DW will conduct weekly grab sample monitoring for the water quality constituents on the reservoir and habitat islands at discharge locations for two weeks prior to commencement of discharge and continue for the duration of discharge.

2. DW will conduct weekly grab sample monitoring for the water quality constituents in the Delta channels at the discharge locations for the reservoir islands two weeks prior to commencement of discharge and continue for the duration of discharge.

3. DW will conduct real-time monitoring for EC in the reservoir and habitat island discharges during all discharge periods.

4. The California Department of Water Resources, United States Bureau of Reclamation, and CCWD currently conduct real-time water quality monitoring at several locations in the Delta and post the data on CDEC, where it will be available to DW.

5. The owners of urban water treatment facilities will provide water quality monitoring and operational data at water treatment plants.

6. The water quality monitoring program shall include quality assurance and quality control provisions.

7. Monitoring parameters will include TOC, DOC, bromide, TDS, EC, chloride, UVA, DO, turbidity, temperature, total nitrogen, total phosphorus, MIB and geosmin, and chlorophyll a. Samples will be collected and algal species will be identified and enumerated for potential T&O producing, filter clogging and/or toxin-producing algae. If cyanobacteria are present, samples will be analyzed for those cyanotoxins of concern recognized by the US EPA or WHO.

8. DW will post weekly summaries of the data collected pursuant to subsections 1 through 3 above on the DW web site or adopt an alternative means of disseminating this information to the WQMAC and interested parties that provides an equivalent degree of accessibility. Grab samples will be collected and submitted for analysis early in the week with a goal that lab results will be completed and posted on the DW website within 72 hours.

9. Hydrodynamic and particle-tracking models will be used to predict both baseline conditions (without Project) and real-time changes at the urban intakes in the Delta prior to, during, and after a Project operation. DW will submit a proposed monitoring and modeling program for approval by the WQMAC prior to operating the reservoir islands with annual updates and approvals of the modeling program thereafter (through the Annual Operating Plan review process) to reflect advances in science and technology. Water quality constituent predictions required by the WQMP shall be calculated in accordance with the initial models and modeling assumptions set forth in Attachment 3, unless otherwise approved by the WQMAC.

E. Screening Procedures and Operational Constraints to Prevent Short-Term Impacts

The process outlined below for screening of Project operations and imposition of operational constraints is intended to prevent short-term impacts to urban water utilities and to ensure adherence to the drinking water quality protection principles 1 through 3 set forth in Section A.

1. Operational screening criteria will be used to identify Project operations that may threaten adherence to one or more of the drinking water quality protection principles. The operational screening criteria are set forth in Attachment 2 and implemented as described below.

2. Prior to DW initiating each diversion to the reservoir islands and each discharge from the reservoir islands and weekly thereafter during continuing diversions and discharges, the hydrodynamic and particle-tracking models will be used to predict whether Project operations (including operations of the habitat islands) are likely to exceed one or more of the operational screening criteria at the urban intakes in the Delta. (See Attachment 2) The impacts of the project will be evaluated by conducting three model runs:

    a. Model Run 1 Baseline – The models will be run assuming that the existing agricultural practices are occurring on the reservoir and habitat islands.

    b. Model Run 2 No Agricultural Operations – The models will be run assuming no diversions or releases from the reservoir and habitat islands. The difference between Model Run 1 and Model Run 2 will provide the "credit" that DW should get for removing the agricultural operations from the islands.

    c. Model Run 3 DW Operations – The models will be run with the projected diversions to and releases from the reservoir and habitat islands. The results of this model run will be compared to the results of Model Runs 1 and 2 to determine if DW is adversely impacting water quality at the urban intakes in the Delta.

3. If the model output indicates that Project operations may exceed one or more of the operational screening criteria at one or more of the urban intakes in the Delta, DW will reduce, reschedule, or otherwise constrain project operations to prevent the exceedance. If the screening criteria that may be exceeded applies to DBPs, DW may, instead of adjusting project operations, conduct further studies (prior to initiating a diversion to the reservoir islands or a discharge from the reservoir islands) to determine whether one or more of the water treatment plant protection principles would be threatened at an urban water treatment plant. (See Attachment 2, criteria B3 and B4).

4. If, upon further study, it appears that Project operations may threaten one or more of the water treatment plant protection principles at an urban water treatment plant, a determination will be made as to whether the threat would be offset by a Project-induced water quality or water supply improvement. If the owners of the impacted water treatment plants agree that the threat would be offset or agree to waive their rights to protection under the WQMP, DW may initiate the diversion to the reservoir islands or discharge from the reservoir islands.

5. If, upon further study, it appears that Project operations may threaten one or more of the water treatment plant protection principles at an urban water treatment plant or plants without offsetting benefits and all of the affected treatment plant owners have not waived their right to protection, Project operations will be reduced, rescheduled, or otherwise constrained as necessary to prevent the impact from occurring.

6. If an urban water treatment plant owner presents a complaint to DW and the WQMAC that: (1) a violation of a water treatment plant protection principle has occurred or is likely to occur in the absence of remedial action, or (2) one of the Project screening criteria set forth in Attachment 2 has been exceeded or is likely to be exceeded in the absence of remedial action, and (3) the WQMAC finds that the complaint has sufficient merit to warrant an investigation, then the WQMAC shall proceed with an investigation of the complaint. Throughout the duration of the WQMAC' s investigation of the complaint and until the matter is resolved by the WQMAC, Project operations shall be restricted such that the maximum discharge rate from a reservoir island shall not exceed the schedule set forth in Table 1. Alternatively, the Project operations may proceed pursuant to the terms of an Emergency Operating Plan that has been approved by the WQMAC. DW shall cooperate with the WQMAC throughout the duration of the investigation.

7. If the WQMAC pursuant to the investigations set forth in paragraph E.6 make a finding that monitoring, modeling, and/or operational constraints fail to prevent a violation of a water treatment plant protection principle resulting from Project operations, or fail to prevent an exceedance of one of the operational screening criteria set forth in Attachment 2 due to Project operations, the WQMAC shall require DW to initiate emergency operations or take remedial actions to correct the problems.

Table 1[1]

TOC Concentration on Bacon Island Minus That of Ambient Water (mg/L)[2,3]	Maximum Discharge Rate from Bacon Island (cfs)[2]	TOC Concentration on Webb Tract Minus That of Ambient Water (mg/L)[3]	Maximum Discharge Rate from Webb Tract (cfs)[2]	Chloride Concentration on a Reservoir Island (mg/L)	Maximum Combined Discharge Rate from Bacon Island and Webb Tract (cfs)[2]
0 to 1.0	1,500	0 to 3.0	1,500	0 to 50	3,000
1.1 to 2.0	1,250	3.1 to 4.0	1,250	51 to 70	2,500
2.1 to 3.0	1,000	4.1 to 5.0	1,000	71 to 90	2,000
3.1 to 4.0	750	5.1 to 6.0	750	91 to 110	1,500
4.1 to 5.0	500	6.1 to 7.0	500	111 to 130	1,000
5.1 to 6.0	250	7.1 to 8.0	250	131 to 150	500
6.1 to 7.0	125	8.1 to 9.0	125	151 to 170	250
Greater than 7.0	40	Greater than 9.0	40	171 to 250	80

Table 1 footnotes:

[1] The restrictions on discharges from the reservoir islands contained in Table 1 for various concentrations of TOC and chloride are not applicable if the TOC and chloride concentrations on a reservoir island are less than or equal to the average TOC and chloride measured in the channels adjacent to the reservoir islands for the 7-day period prior to initiating the discharge.

[2] The maximum discharge rate means the average discharge rate over a 14-day period or the duration of the discharge, whichever time period is less. The maximum discharge rate shall be further constrained, as necessary, to limit the total contribution from the reservoir islands at the urban intakes to 25% of the combined export pumping at the Banks and Tracy pumping plants.

[3] Ambient water concentration is the value most representative of the channel concentration in the absence of Delta Wetlands discharges. For the purposes of this WQMP, ambient concentration means the weekly grab sample concentration taken prior to initiating the discharge. During the period of discharge, the ambient concentration will be the lowest of the updated grab sample concentrations taken in the channels around each reservoir island. TOC in Table 1 is the difference between island TOC and ambient channel TOC. However, chloride is the absolute island chloride concentration. Ambient concentration does not apply to the chloride measurements. Ambient concentrations are monitored to represent the TOC in the channels around the islands in the absence of any DW discharges. Discharges are normally only permitted during July 1 through November 30 during which time TOC in the Delta tends to decrease, i.e., maximum TOC tends to occur in February-April and lowest TOC tends to occur November-December. It is important therefore to update the ambient TOC value as often as possible. DW is required to take weekly TOC samples so that will need to represent the prior 7-day average.

F. Mitigation of Long-Term Water Quality Impacts.

The process outlined below for mitigation of long-term water quality impacts due to Project operations is intended to prevent long-term impacts to urban water utilities and ensure adherence to the drinking water quality protection principles 3 and 4 set forth in Section A. Should Project operations produce a long-term net increase in TOC, DOC, TDS, bromide, chloride, total nitrogen, total phosphorus, MIB, geosmin, algal toxins and T&O producing, filter clogging, and/or and toxin producing algae loading in the urban diversions, mitigation may be necessary, as described below:

1. During the course of the 12-month operating plan, DW shall maintain a running account of the changes in TOC, DOC, TDS, bromide, chloride, total nitrogen, total phosphorus, MIB, geosmin, algal toxins and T&O producing, filter clogging and/or toxin-producing algae in the waters diverted from the Delta for urban use due to Project operations pursuant to the data reported by the owners and operators described in Sections D.4 and D.5 above.

2. Once every three years, DW shall submit an accounting of the net increase or decrease in TOC, DOC, TDS, bromide, chloride, total nitrogen, total phosphorus, MIB, geosmin, algal toxins and T&O producing, filter clogging and/or toxin-producing algae loading in the water diverted from the Delta for urban use due to Project operations (including habitat island operations).

3. DW shall be required to acquire offsets or otherwise mitigate 150% of the net increase in TOC, DOC, TDS, bromide, chloride, total nitrogen, total phosphorus, MIB, geosmin, algal toxins and T&O producing, filter clogging and/or toxin-producing algae loading greater than 5% in the urban diversions due to Project operations.

4. DW must acquire the offsets or complete the mitigation at its expense within 24 months after the submission of the accounting set forth in 2 above. Any offset or mitigation that is provided in the current accounting period that is due to a mitigation requirement that accrued during a previous accounting period shall be excluded from the calculation of the net increase for the current accounting period.

5. In recognition of initial Project start-up, long-term mitigation requirements for TOC and DOC loading shall be waived for the first year of reservoir operation; however, the screening procedures and operational constraints to prevent short-term impacts set forth in Section E shall still apply.

ATTACHMENT 1
WATER QUALITY MANAGEMENT AND ACTION COMMITTEE

1. **Purpose:** A Water Quality Management and Action Committee ("WQMAC"), or an equivalent mutually acceptable authority, shall be appointed to oversee the implementation of the Water Quality Management Plan ("WQMP") for the Delta Wetlands Project ("Project").

2. **Members:**

    a. **Qualifications:** The three members and three alternates shall be registered professional engineers, public health professionals or scientists possessing a thorough understanding of Delta operations and recognized for their expertise in organic and inorganic water chemistry and drinking water treatment.

    b. **Appointment Process:** The State Water Resources Control Board ("SWRCB"), California Urban Water Agencies ("CUWA"), and Delta Wetlands Properties ("DW") shall each appoint one member and one alternate. Each prospective member of the WQMAC shall be required to disclose any past or current conflicts of interest that may affect their ability to serve as impartial members of the WQMAC. Appointment of prospective members with past or current conflicts of interest must be approved by the mutual consent of CUWA and DW. In the event that the SWRCB does not appoint its member or alternate to the WQMAC, CUWA and DW shall appoint the SWRCB's member or alternate member. Each of the WQMAC members shall be appointed for a term of four years. At the end of the 4-year term, the same selection process will be used to select the new WQMAC.

3. **Term:** The WQMAC shall be established prior to the first diversions to storage on Bacon Island or Webb Tract ("initial operations") and shall continue thereafter for the duration of Project reservoir operations.

4. **Compensation:** Members of the WQMAC shall be compensated by DW for their time on an hourly basis. Such costs, including costs of reports which may be prepared and studies which may be undertaken by the WQMAC shall be part of the annual operation and maintenance costs of the Project.

5. **Duties:**

    a. The WQMAC shall serve as a neutral water quality advisory panel, hearing and investigating formally identified problems purportedly caused by Project reservoir operations, including but not limited to nonconformance with the Annual Operating Plan and violations of the Drinking Water Quality Protection Principles.

    b. Prior to initial operations and annually thereafter, DW shall submit a proposed Annual Operating Plan to the WQMAC and the WQMAC shall review, comment and approve the Annual Operating Plan pursuant to Section B of the WQMP.

c. DW shall make available water quality monitoring and modeling data to the WQMAC pursuant to Sections D and E of the WQMP.

d. During the first two years following initial operations, the WQMAC shall review water quality monitoring data at each stage of filling and discharge of the reservoir islands.

e. At the end of the third year of operations and every three years thereafter, DW shall submit to the WQMAC an accounting of the net increase or decrease in water quality parameters of concern in the water diverted from the Delta for urban use due to Project operations pursuant to Section F of the WQMP. Prior to initiating the fourth year of operations and each year thereafter, the Annual Operating Plan shall include a plan to offset or otherwise mitigate any net increase in water quality parameters of concern pursuant to Section F of the WQMP.

f. If the WQMAC determines that the Project operations are not in conformance with the Annual Operating Plan, the WQMAC shall require the permittee to initiate emergency operations or take remedial actions to correct problems as provided for in paragraph E.7 of the WQMP.

g. The terms of the WQMP may be adjusted over time by the SWRCB as set forth below. The SWRCB reserves jurisdiction over changes in the WQMP to coordinate or modify its terms for the protection of other legal users of water and the public interest as future conditions may warrant. The SWRCB delegates authority to the Executive Director of the SWRCB to take actions under this reservation of jurisdiction as set forth below.

    i. During the third year of Project operations, the WQMAC shall review the WQMP to determine if changes in any of the WQMP terms are advisable. In its review, the WQMAC shall examine actual operation of the Project to date and any adverse effects of Project reservoir operations, including impacts to urban water agencies, degradation of drinking water quality, overall progress toward achieving continuous improvement of drinking water source quality, and any recent changes in state and federal drinking water regulations. The WQMAC will base each of its recommended changes to WQMP terms, if any, on its independent, professional judgment. At the conclusion of its review, the WQMAC shall issue a written list of its recommended changes, if any. The list shall be sent by the WQMAC to the SWRCB, DW, CUWA, and all other Interested Parties.

    ii. If no party raises a reasonable objection to a change recommended by the WQMAC within 30 days of service of any proposed change, then the Executive Director of the SWRCB may approve the change without the need for a comment period or hearing. In the event of any objection, the SWRCB may only approve the change after it provides notice of and an opportunity to comment on the proposed change. If requested by DW, CUWA, or any Interested Party, the SWRCB may hold a hearing on the proposed change.

h. After its initial 3-year review of the WQMP as set forth above, the WQMAC may thereafter periodically review and change the terms of the WQMP so long as the SWRCB review and approval process set forth above is followed.

ATTACHMENT 2
OPERATIONAL SCREENING CRITERIA

Operational Constraints

The operational screening criteria outlined in this attachment were developed to support the process outlined in Section E of the Water Quality Management Plan ("WQMP") for screening of Delta Wetlands Project ("Project") operations and imposition of operational constraints. This process is intended to support Delta Wetlands' ("DW") adherence to the drinking water quality protection principles 1 through 3 described in Section A of the WQMP.

These screening criteria are based on existing state and federal standards for disinfection by-products and their precursors. Should drinking water DBPs, contaminants or precursors, or any other drinking water contaminants be further regulated under state or federal law, the WQMAC shall recommend that the SWRCB amend the screening criteria to ensure that the intent of the drinking water quality protection principles continues to be met.

Evaluation of Project operations using these screening criteria will be based on real-time field measurements, laboratory analyses, and computer modeling results, all of which are subject to uncertainties. For purposes of determining whether the Project has caused an exceedance of one or more of the operational screen criteria, an uncertainty of ±5% of the screening criteria will be assumed.[2] Should greater precision in measurements and calculations be developed, the improved level of confidence will be used as appropriate for each individual parameter.

An exceedance of the operational screening criteria set forth in Sections A, B and C below shall be calculated as a 14-day average, or the average for duration of the discharge, whichever time period is less.

A. TOC Operational Screening Criteria

The criteria below will be used in the screening procedures set forth in paragraphs E.1 and E.2 of the WQMP and in the imposition of operational constraints in paragraphs E.3 and E.5 of the WQMP. The criteria are intended to prevent an impact due to Project-related TOC loading that may cause an increase in water treatment costs.

1. Project operations that cause an increase in TOC of more than 1.0 mg/L at the urban intakes; or

[2] An uncertainty of ±5% shall mean that an exceedance of an operational screening criterion does not occur until the Project causes the following values to be exceeded: condition A.1 not applicable; conditions A.2 and A.3 = 4.2 mg/L TOC; conditions B.1 and B.3 = 67.2 µg/L TTHM; conditions B2 and B4 = 8.4 µg/L bromate; conditions C.1 and C.2 not applicable; conditions D.1, D.3 and D.4 not applicable; condition D.2 = predicted increase greater than 5% total nitrogen or total phosphorus at one or more urban intakes.

2. Project operations that cause TOC concentrations at the urban intakes to exceed 4.0 mg/L; and

3. Project operations that cause TOC concentrations at a water treatment plant to exceed 4.0 mg/L.

B. Water Treatment Plant Protection Principles for DBP Formations

The criteria below will be used in the screening procedures set forth in paragraphs E.1 and E.2 of the WQMP and in the imposition of operational constraints in paragraphs E.3 and E.5 of the WQMP. The criteria are intended to prevent an impact due to Project-related DBP precursor loading that may cause health impacts to water users or may cause or contribute to a water treatment plant violation of a health regulation:

1. Project operations that cause or contribute to modeled Total Trihalomethanes ("TTHM") concentrations in drinking water in excess of 64 µg/L, as calculated in the raw water of an urban intake in the Delta;

2. Project operations that cause or contribute to modeled bromate concentrations in drinking water in excess of 8 µg/L, as calculated in the raw water of an urban intake in the Delta;

3. Project operations that cause or contribute to predicted TTHM concentrations in drinking water in excess of 64 µg/L, as calculated from measurements at the outlet of a water treatment plant; or

4. Project operations that cause or contribute to predicted bromate concentrations in drinking water in excess of 8 µg/L, as calculated from measurements at the outlet of a water treatment plant.

C. Salinity Operational Screening Criteria

The criteria below will be used in the screening procedures set forth in paragraphs E.2 and E.3 of the WQMP and in the imposition of operational constraints in paragraph E.5 of the WQMP. The criteria are intended to promote Project operations that select the highest water quality for diversion to the islands and minimize salinity impacts associated with discharges from the reservoir islands:

1. Project operations that cause an increase in salinity of more than 10 mg/L chloride at one or more of the urban intakes; or

2. Project operations that cause or contribute any salinity increase at the urban intakes in the Delta exceeding 90% of an adopted salinity standard (e.g., Rock Slough chloride standard defined in SWRCB Decision 1641).

D. Nutrients, Algal Toxins and T&O Producing, Filter Clogging and/or Toxin-Producing Algae Operational Screening Criteria

The criteria below will be used in the screening procedures set forth in paragraphs E.1 and E.2 of the WQMP and in the imposition of operational constraints in paragraphs E.3 and E.5 of the WQMP. The criteria are intended to promote Project operations that select the highest water quality for diversion to the islands and minimize taste and odor impacts at a water treatment plant that are caused or contributed to by discharges from the reservoir islands:

1. Due to the short travel time between the islands and the urban intakes, nutrients and taste and odor compounds and filter clogging and T&O producing algae will be treated as conservative constituents in the models unless future studies or analyses indicate otherwise.

2. DW operations shall not cause an increase in total nitrogen or total phosphorus at one or more urban intakes.

3. DW operations shall not cause MIB and geosmin concentrations to exceed 8 ng/L at one or more urban intakes. However, if MIB and geosmin concentration in the DW discharge are lower than the MIB and geosmin concentrations in the Delta channels, DW can discharge to dilute the concentrations in the Delta channels.

4. Algal toxins are an emerging area of concern. DW will track the development of water quality criteria for algal toxins and report on how algal toxins will be managed in the Annual Operating Plan. DW shall not cause algal toxins to reach problematic levels at one or more of the urban intakes. If algal toxin concentrations in the DW discharge are lower than the algal toxin concentrations in the Delta channels, DW can discharge to dilute the concentrations in the Delta channels.

ATTACHMENT 3
INITIAL MODELING ASSUMPTIONS

The screening procedures and long-term mitigation requirements of the Water Quality Management Plan ("WQMP") require several analytical tools to predict water quality and disinfection by-products ("DBP") changes or Total Trihalomethanes ("TTHM"). Three models will be required to implement the WQMP: 1) a water quality model, 2) a particle-tracking model, and 3) a water treatment model for DBPs. The Annual Operating Plan sets forth periodic update and approval requirements of the final modeling program; however, the initial modeling assumptions included in the evaluations for the WQMP have been included below:

1. Initial modeling assumptions

   a. Baseline hydrology: existing conditions and short-term forecasts (50% exceedence) of future conditions

   b. Water quality and particle-tracking model: The most recent public version of DWR's Delta Simulation Model with real tide simulations

2. TTHM Model (Malcolm Pirnie)

$$TTHM = 7.21 \times TOC^{0.004} \times UVA_{254}{}^{0.534} \times (Cl_{DOSE} - 7.6 \times NH_3N)^{0.224} \times Cl_{TIME}{}^{0.255} \times (Br+1)^{2.01} \times (pH-2.6)^{0.719} \times T^{0.48}$$

   Where:

   TOC = raw water TOC (mg/l) x (0.75 if TOC<4 or 0.65 if TOC>4)
   UVA_{254} = 0.033 x TOC + 0.010
   Cl_{DOSE} (Cl:TOC ratio) = 1.0
   NH_3N = Not Applicable
   Cl_{TIME} (contact time) = 1.0 hour
   Br = raw water bromide (mg/I)
   pH = 7.0
   T = Monthly average raw water temperature (9-24°C)

3. Bromate Model (Ozekin)

$$BRM = [1.63 \text{ E-}06 \times TOC^{-1.26} \times pH^{5.82} \times O_{3DOSE}{}^{1.57} \times Br^{O.73} \times O_{3TIME}{}^{0.28}] \times BRMCF$$

   Where:

   TOC = raw water TOC (mg/l) x (0.75 if TOC<4 or 0.65 if TOC>4)
   pH = 7.0
   O_{3DOSE} (O_3:TOC ratio) = 0.6
   Br = raw water bromide (µg/l)
   O_{3TIME} (contact time) = 12 minutes
   BRMCF (bromate correction factor) = 0.56