Municipal Water Quality Investigations Program
2009-2010 Workplan

5/12/09
Final

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1 POTENTIAL MWQI PROGRAM IMPACTS ASSOCIATED WITH THE STATE GOVENOR'S EMPLOYEE FURLOUGH PROGRAM

Beginning in February 2009 and ending in June 2010, the Governor implemented mandatory State Employee furloughs of 2 unpaid days (or roughly 10% decrease in staff resources) per month. This section identifies MWQI Program core elements that will be maintained as planned during the 17 month furlough period, and program elements that will either be delayed in their completion and/or eliminated. To accommodate a 10% reduction in staff resources and to meet routine and unforeseen demands of core Program elements, staff resources will potentially be shifted away from new program elements (as needed). Staff time may also become limited to participate in multiple meetings (both MWQI and outside agencies) and to attend non-mandatory training and conferences.

MWQI core elements that will receive the highest priority during this time include;

a) Water quality monitoring (both real time and discrete) at existing stations and sites in order to maintain integrity of MWQI's 27-year water quality data set and to continue to provide timely information of changing water quality conditions in the Delta as source water for the SWP.
b) Real time forecasting used in the RTDF weekly report and other critical communication for Program stakeholders.
c) Weekly RTDF reports and the biennial report.
d) Data management activities pertaining to database infrastructure enhancement and development as listed in this work plan and that will greatly improve long term storage and retrieval of RTDF data
e) Program management activities listed in the MWQI funding agreement and those mandated by DWR and in general, required for health and safety of MWQI staff.
f) Other required Program activities that are mandated by DWR and/or essential to the MWQI Program (i.e. training, specific meetings and conferences, purchasing, contracts, etc).
g) Special studies that are fully developed, already underway or that only require minimal staff time in the office to complete initial phase. These studies will continue as planned unless it becomes apparent that additional staff resources are needed for monitoring, forecasting and reporting tasks. Adjustments to timelines will be made to accommodate delays as opposed to eliminating studies.

Work on specific program elements and/or tasks that will most likely be delayed due to the 10% reduction in all DWR staff time include;

a) Installation of the new real time water quality station at the Gianelli plant.
b) Completion of final SOP document for MWQI water quality monitoring.

c) Some delays may occur in the development of the CA Aqueduct model where new forecasting and planning tools and cross-training of staff is required.
d) Cross-training of new MWQI ES on modeling and GIS functions.
e) RTDF data management tasks may be delayed when assistance is needed from either Division of Technology Services or MWQI staff. The MWQI Data Management Consultant (Dennis Huff) can continue to work regularly scheduled hours.
f) With respect to duties covered by MWQI staff, conversion of the RTDF weekly report to an online version could be delayed.
g) Several tasks listed under "Improvement to Field Data Communications" will be delayed.
h) Implementation of special studies new to this work plan will be delayed, if needed, to accommodate core Program elements.
i) Pending DWR Executive Management approval - Implementation of recommendations in the MWQI Emergency Response document will be delayed most likely until after the furlough period has ended based on the need for input from various DWR groups.
j) To ensure that core functions are not affected, staff attending multiple MWQI related meetings could be required to limit participation to one meeting a month, and/or only MWQI management would attend the monthly TAC meetings.
k) Annual meetings may be limited to one if needed.
l) Reduction in purchasing and contracting to critical needs to reduce staff time utilized to obtain items and services.

2 MISSION STATEMENT

The mission of the Municipal Water Quality Investigations Program (MWQI Program) is to a) support the effective and efficient use of the State Water Project (SWP) as a source water supply used for municipal purposes through monitoring, forecasting, and reporting of SWP water quality; b) provide early warning of changing conditions in source water quality used for municipal purposes; c) provide data and knowledge based support for operational decision-making on the SWP; d) conduct scientific studies of drinking water importance; and e) provide scientific support to DWR, the State Water Project Contractors Authority-MWQI Specific Project Committee (SPC), CALFED, and other governmental entities.

MWQI Core Competencies

- Continuous long-term water quality monitoring (grab samples) in the Delta.
- Real time water quality monitoring (automated, high frequency data collection stations) in the Delta.
- Provide science support on Delta and SWP drinking water issues.
- Analysis of Delta drinking water quality monitoring data.
- Primary source of Delta drinking water quality historical data.
- SWP drinking water quality early warning (RTDF-CP).
- SWP drinking water quality forecasting (RTDF-CP).
- Provide drinking water quality support (data, expertise) to CALFED and other agencies.

Customers/Regulators utilizing MWQI Program data

- State government
- CALFED
- Central Valley Regional Water Quality Control Board
- CDPH
- US EPA
- State Water Project Contractors Authority-MWQI Specific Project Committee
- Contra Costa Water District
- DWR's Operation Control Office
- DWR's Bay Delta Office

3 INTRODUCTION

3.1 Background and Workplan Structure

This is a workplan for work to be performed under the California Department of Water Resources (DWR) Municipal Water Quality Investigations Program (MWQI Program) for the FY 2009-10 (July 1, 2009 to June 30, 2010). The total MWQI Program budget for FY 2009-10 is $3.1 million. Of this total, $2.9 million is allocated directly to the MWQI Program and $200,000 is kept as part of the State Water Project Contractors Authority (SWPCA), MWQI-SPC fund to cover consultants and other expenses.

This work will be performed under the 2008-2010 MWQI Agreement between DWR, SWPCA, and 16 State Water Project (SWP) contractors who purvey drinking water. Under this agreement, work to be performed is identified, prioritized, and approved annually by the MWQI Technical Advisory Committee (MWQI TAC), composed of technical representatives of the participating SWC contractors, DWR, SWPCA, and invited members of outside agencies. Approval of the annual workplan is provided by "voting members" of the MWQI TAC, which include DWR and the 16 SWP contractors. and constitutes a commitment of funding to the planned work. Some of the tasks outlined in the annual workplan will be completed using funds from a supplemental account provided under the MWQI Agreement and managed by SWPCA. Expenditures using this fund are approved annually by the MWQI SPC, which is made-up of representatives from 15 of the 16 participating SWP contractors. Representatives serving on the MWQI-SPC can differ from those serving on the MWQI TAC.

Based on discussions between DWR and the MWQI SPC, this workplan represents a streamlined version from those of previous years. Budget information as well as a shortened description of each element or project is included in the workplan. Three stand-alone documents compliment this workplan. These documents are: a) a series of appendices, b) Gantt charts, which graphically show historical and projected project status, and c) a series of Excel spreadsheets that detail all MWQI projects, both past and present. The appendices include: a) a narrative breakdown of all SWPCA funding by Program Element (Appendix 1); b) detailed information on the history of the MWQI program (Appendix 2); c) a compilation of in-depth project proposals (both past and current, where appropriate) of the special studies (Appendix 3); and d) a copy of the MWQI 5 year strategic plan. These stand alone documents allow interested parties to learn more about other aspects of the program while keeping the basic workplan document fairly short and concise.

This document presents the budget outlays for fiscal year 2009/2010 followed by the workplan elements in the MWQI program. These elements are:

- Water Quality Assessment
- The Real Time Data and Forecasting Comprehensive Program (RTDF-CP) which includes
    - Real Time Water Quality Monitoring
    - Real Time Forecasting
    - Real Time Data Dissemination
- Special Studies
- Emergency Response
- Other Water Quality Program Related Activities
- Program Management
- Other Required Program Costs

Within each of these elements, detailed deliverables are identified along with estimated start and completion dates and the lead organization. Many of the workplan elements either incorporate or overlap with high priority action items identified in the 2006 Sanitary Survey Update. Some of the tasks associated the 2006 Sanitary Survey Update are associated with groups outside of MWQI. These tasks are included in this workplan under RTDF-CP Sections 6.1-6.3 as a guide to their progress (for example pump-in activities in the SWP, or streamlining equipment throughout the department), but are not necessarily related managerially to the MWQI program. Unless there is a direct connection to the MWQI program through the BCP positions, accomplishments associated with these projects are as a result of the ongoing efforts of the group outside of MWQI.

In this workplan cycle, a number of projects are ongoing and continue forward from the FY 2008-09 workplan. These include many of the tasks associated with the RTDF-CP. Other projects listed in the FY 2008-09 workplan have completed their fact-finding phase and have evolved into the projects outlined in this workplan. These include the investigation into urban runoff, the investigation of salinity discharges into the South Old River, and the circulation study in O'Neill Forebay. New projects to this workplan include: providing data to improve tributary boundary conditions for organic carbon in DSM2, evaluation of organic carbon locations under dual conveyance system, a spectrofluorometer analysis study, and a water quality compendium project. For this fiscal year, there are no grant funds tied to other agencies. A contract between the MWQI Program and the San Luis Delta Mendota Water Authority for supplemental support of the MWQI water quality monitoring equipment installed at the Jones Pumping Plant is still in effect. Currently, the New Technologies subcommittee has fulfilled all of its obligations from the FY 2008-09. With no new anion technology on the horizon, the subcommittee will reconvene when new instruments or technologies require investigation.

3.2 Program Accomplishments

The MWQI Program has accomplished a number of goals listed in the FY 2008-09 workplan. These include:

- Installation of a real-time carbon instrument at the Jones Pumping Plant and training of San Luis Delta Mendota Water Authority staff on basic troubleshooting and operation tasks.
- Completion of an Emergency Response document that summarizes the role of water quality in emergency events and a description of programs in several DWR divisions and their responsibilities during an emergency. The document is in review with DES upper management.
- Mapping and documentation of all DWR real-time stations in the Sacramento and San Joaquin Rivers.
- Production of draft Standard Operating Procedure Manuals for MWQI real time instruments.
- Development of a draft report of long term trends of organic carbon and bromide in the Delta.
- Construction of a new water quality monitoring building and consolidation of MWQI and O&M Water Quality real time instruments at the Banks Pumping Plant (July 2008).
- Workshop held April 21, 2009 in Vacaville, California with presentations by MWQI staff on the status and findings of their projects and final discussion and approval of this workplan.
- Workshop held on locations for future MWQI stations.
- Development of an in-house web prototype for daily RTDF data reports to replace the weekly RTDF report.
- MWQI analysis of Delta Island Consumptive Use data used in the South Delta published in Delta Modeling yearly report.

4 PROGRAM FUNDING NEEDS

4.1 MWQI and SWPCA Funds

For Fiscal Year 2009/010, the MWQI Program Budget is $3.1M ($2,900,000 MWQI DWR baseline budget and $200,000 SWPCA managed fund). $2.9M will be entered into SAP (DWR's accounting system) as the baseline and non-reimbursable portion of the MWQI Program budget. The budget for this portion of the funding is shown in Table 1 under the heading MWQI Baseline Funding. The remaining $200,000 of the $3.1 M will be managed by SWPCA. The establishment and use of the SWPCA fund for the MWQI Program has been a great success. During FY 2006-07 the MWQI-SPC was formed to assist in managing these funds. This committee functions under the SWPCA and meets at least once per year to approve expenditures for the MWQI Program using these funds. This fund is used to acquire student assistants , hire consultants, and to purchase certain goods and services deemed necessary and desirable for station operation by both the MWQI Program and the Specific Projects Committee. The use of this fund has increased the responsiveness and flexibility of the MWQI program to meet stakeholder needs. In the use of the fund, DWR staff and MWQI SPC seeks the most cost effective alternative. Multiple sources are contacted, and the most qualified and economical product or consultant is hired. Use of the SWPCA fund is expected to continue. The budget for this portion of the funding is shown in Table 1 under the heading SWPCA Funding. Appendix 1 in the stand-alone appendices identifies the specific tasks to be implemented using SWPCA funding.

Table 1. Program Element Costs FY 2009-10 (MWQI and SWPCA Funds)

		MWQI Baseline Funding						SWPCA Funding						
Workplan Element No.	Program Element	Labor PY's	Labor Hours	Labor Cost	Contract/ Other Cost	Supplies/ Equip Cost	Total Cost	Labor PY's	Labor Hours	Labor Cost	Contract/ Other Cost	Supplies/ Equip Cost	Other Cost	Total Cost
5	**Water Quality Assessment**													
	Collection of Grab Samples	0.95	1689	$142,622		$5,000	$147,622							
	Biennial Report	0.8	1422	$83,999	$11,050		$95,049	0.5	600	$9,007				$9,007
6.1	**Real Time Water Quality Monitoring**													
	MWQI Real Time WQ Stations	3.45	6134	$525,762	$38,600	$45,000	$609,362	1	1201	$14,412				$14,412
	O&M WQ HQ	1	1778	$106,378			$106,378							
	Gianelli WQ Monitoring Station						$0							
6.2	**Real Time Forecasting**													
	Bay-Delta Modeling	1	1778	$158,135			$158,135							
	OCO Modeling	1	1778	$206,568			$206,568							
6.3	**Real Time Data Dissemination**													
	RTDF Data Dissemination and Reporting	1.35	2400	$201,555			$201,555							
	Administration & Database Activities					$2,500	$2,500	1	1000	$62,400				$62,400
	Long-term trends analysis/reporting	0.6	1067	$54,492			$54,492							
7	**Special Studies**													
7.1	Urban Sources and Loads	1.25	2222	$153,282		$3,000	$156,282							
7.2	NDMA Study	0.65	1156	$120,094			$120,094							
7.3	South Delta EC Study	0.55	978	$103,716			$103,716							
7.4	O'Neill Forebay Water Circulation Study	0.85	1511	$102,366		$500	$102,866							
7.5	Update of Water Quality Compendium	0.45	800	$45,710			$45,710	0.5	601	$9,008				$9,008
7.6	Organic Carbon Boundary Study	0.45	800	$51,538			$51,538							
7.7	Spectrofluorometry Study	0.35	622	$61,017		$2,000	$63,017	1	100	$6,000				$6,000
7.8	Dual Conveyance Study	0.1	178	$14,508			$14,508							
8	**Emergency Response**	0.2	356	$20,315			$20,315							
10	**Program Management**	1	1778	$190,104		$79,500	$269,604	1		$55,000			$3,000	$58,000
	Funds not assigned to specific Program Elem.					$370,689	$370,689						$41,173	$41,173
Total		16	28447	$2,342,161	$49,650	$508,189	$2,900,000	5	3502	$155,827			$44,173	$200,000

Note: Program elements 9 (Other WQ program related activities) and 11 (Other Program required costs) evenly divided among staff and included in existing Program elements
Bryte Laboratory costs covered by overhead charges

Includes the $8,160 budgeted for SLDMWA operation and maintenance of analyzer at Jones PP. Note that the $31,428 for station modification had not been invoiced as of 5-12-09, but funds for this charge were budgeted in the 08-09 budget.

5 WATER QUALITY ASSESSMENT

Water quality monitoring has been a key feature of the MWQI Program since its inception in 1982. Data from the Program are used extensively by DWR, MWQI SPC, numerous other federal, State, and local agencies, and the public, for drinking water supply planning studies. Data from this program are used to identify longer-term trends of drinking water quality changes in the Delta region and in the SWP. Monitoring data also help DWR and other agencies develop research and mitigation measures to reduce drinking water contaminants in Delta waters. In collaboration with the DWR Division of Operations and Maintenance (O&M), monitoring data from the Delta and California Aqueduct are being used to develop an "early warning" system having the potential to provide advance notice to Delta water users of possible drinking water quality problems.

Water quality assessment consists of two different monitoring strategies, 1) discrete, grab samples, and 2) continuous real time monitoring via remote instrumentation. This section focuses on discrete grab sample monitoring in FY 2009-10, while section 6.1 focuses on continuous remote real-time instrumentation monitoring.

5.1.1 Discrete Sample Collection and Analysis

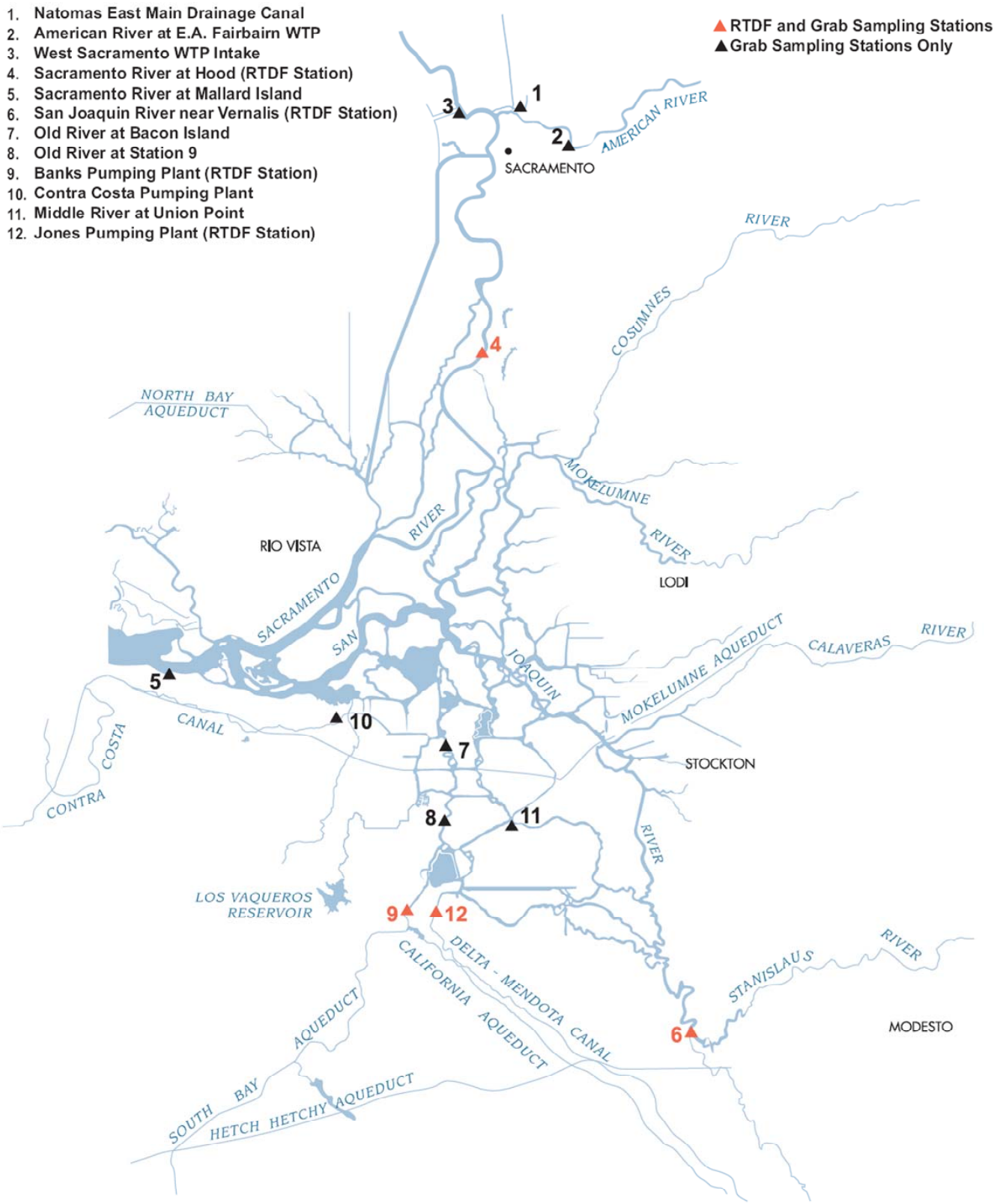
In FY 2008-09, instrumentation at the Jones Pumping Plant became fully functional bringing the total number of stations with monthly grab sampling and data to 12 Delta sites. Table 2 summarizes locations, water quality parameters, and frequencies while Figure 1 presents a map of all (grab and real time) sampling sites for the FY 2009-10 workplan period. Location, frequency, and analytes are unchanged from those listed in the FY 2008-09 workplan, however with the Jones Pumping Plant Station becoming operational, grab samples are being collected bi-weekly to compare analyte results between the pumping plant where instruments are installed, and at the headworks of the Delta Mendota Canal, where the pumps discharge the water into the open canal. This workplan also includes the production of a biennial report analyzing MWQI grab sample data collected between October 2007 and September 2009.

Table 2. MWQI Discrete Sampling: stations, parameters, and frequency

Station #	Stations	Analytes Collected	Frequency
1	Natomas East Main Drainage Canal (NEMDC)	Std. Mineral, nutrients, TOC, DOC, UVA, turbidity, bromide, metals	Monthly
2	American River at EA Fairbarin WTP Intake (AMERICAN)	Std. Mineral, nutrients, TOC, DOC, UVA, turbidity, and bromide	Monthly
3	Sacramento River at West Sacramento WTP Intake (SACWSACINT)	Std. Mineral, nutrients, TOC, DOC, UVA, turbidity, and bromide	Monthly
4	Sacramento River at Hood (HOOD)	Std. Mineral, nutrients, TOC, DOC, UVA, turbidity, and bromide	Bi-weekly
5	Sacramento River at Mallard Island (MALLARDIS)	Std. Mineral, nutrients, TOC, DOC, UVA, turbidity, and bromide	Monthly
6	San Joaquin River near Vernalis (VERNALIS)	Std. Mineral, nutrients, TOC, DOC, UVA, turbidity, and bromide	Bi-weekly
7	Old River at Bacon Island (OLDRIVBACISL)	Std. Mineral, nutrients, TOC, DOC, UVA, turbidity, and bromide	Monthly
8	Old River near Byron Tract (STATION09)	Std. Mineral, nutrients, TOC, DOC, UVA, turbidity, and bromide	Monthly
9	‡ Banks Pumping Plant at Headworks (BANKS)	Std. Mineral, Turbidity, UVA, TOC, DOC, Bromide, total phosphorous	Bi-weekly
10	Contra Costa Pumping Plant at Rock Slough (CONCOSPP01)	Std. Mineral, nutrients, TOC, DOC, UVA, turbidity, and bromide	Monthly
11	Middle River @ Union Point (MR UNION)	Std. Mineral, Turbidity, UVA, TOC, DOC, Bromide, nutrients	Monthly
12	Jones Pumping .Plant at DMC and at DMC Headworks (DMC)	Anions,, nutrients, TOC, DOC	Bi-weekly

‡ Samples collected by DWR's Operations and Maintenance (O&M)

Figure 1. MWQI Discrete ("Grab") & Real time Sampling Locations, FY 2009/10



5.1.2 Discrete Grab Sample Deliverables and Timelines

Discrete grab sample tasks and deliverables are:

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
Records of monthly and bi-weekly, monitoring data.	**MWQI**	na	Currently available upon request
Records of periodic calibration of field monitoring equipment	**MWQI**	na	Currently available upon request
Records demonstrating consistent and timely application of QA/QC procedures	**MWQI**	na	Currently available upon request
Timely analysis and posting of results to the Water Data Library	**MWQI**	na	Monthly Available on-line
Production of October 2007 – September 2009 Biennial Report of MWQI Grab Sample Data	**MWQI**	October 2009	June 2010

na = not applicable or available

6 REAL TIME DATA AND FORECASTING COMPREHENSIVE PROGRAM

The RTDF-CP focuses on providing one location for real-time drinking water quality data gathered across agencies to enable water managers to make operating decisions based on upcoming changes in water quality. In tandem with this effort is a modeling component to allow greater predictive ability of water quality in real time and the future. To gather the necessary data, the RTDF-CP crosses both DWR and agency lines. Historically, the geographic scope of the MWQI Program has been confined to the Delta. However, the scope of real time monitoring and forecasting encompasses not only the watersheds of the Delta, but the SWP, and portions of the federal Central Valley Project that are interconnected to the Delta and SWP. Thus, within DWR, this element of the workplan includes participants and MWQI funded positions within DWR's Bay Delta Office, the Operations Control Office, and the Division of Operations and Maintenance, Water Quality Section.

The RTDF-CP consists of:

Real time monitoring

Water quality forecasting

Information management and dissemination

Emergency response is also part of the RTDF-CP, but is treated separately in this workplan.

Real time monitoring activities receive technical advice and guidance from the RTDF Steering Committee, a group of technical experts composed of SWC staff and staff from participating agencies. The RTDF Steering Committee reports to the MWQI TAC. As such, at a special meeting in February 2008, the RTDF Steering Committee determined immediate and long-term tasks, deliverables and timelines for the monitoring, forecasting and information/data dissemination portion of the RTDF-CP. The tasks and deliverables listed in this workplan represent the RTDF Steering Committee's recommendations to the MWQI TAC of the work that needs to be conducted during this and future workplan cycles. On April 21, 2009 at the MWQI-SWC- meeting held in Vacaville, it was agreed that the level of RTDF-CP detail presented in this workplan was agreeable provided that meetings continued between MWQI, BDO, OCO and interested SWC to refine and prioritize tasks and deliverables. This was deemed necessary to avoid conflicting RTDF-CP priorities that result in work stoppages of other key

RTDF projects and facilitate tracking of RTDF-CP projects as a whole. Such meetings have already begun.

6.1 RTDF-CP-Real Time Monitoring

Real time results are used to: a) make informed operational decisions affecting the Delta and SWP; b) support development of water quality forecasting tools for better managing of SWP water supplies; c) provide early warning of changing water quality conditions for users downstream; and d) for water quality and water supply planning studies. In addition to DWR and the SWC, this information is used by many federal, state, and local agencies, and the public.

This program element is comprised of two parts; a) field operations which includes the operation and maintenance of all automated sampling equipment, timely transmission of real-time data to users, documentation of Standard Operating Procedures, and implementation and documentation of QA/QC of the is data, and b) the synthesis of real time data from a variety of federal, State and local agency water quality monitoring programs, rapid data quality control, analysis, and dissemination of results. These results are currently provided via weekly electronic reports. Table 3 summarizes station locations, water quality parameters, and automated analyzer equipment used by the MWQI Real time Monitoring Program. Figure 1 shows the location of real-time stations.

Deliverables in the FY 2009-10 workplan focus on efficient operation of existing sites and refining the operation of the newly installed Jones Pumping Plant (PP) real time instrumentation. This funding cycle also encompasses the installation of monitoring equipment at the Gianelli Pumping and Generating Plant. With real-time stations located at Hood, Vernalis, Banks, and the Jones PP, one of the main objectives of the RTDF-CP to have organic carbon available to determine baseline concentrations, timing, and loading values of water entering the Delta and the State Water Project is met. The goal to achieve similar results for anions, specifically bromide, or nutrients is sidelined by the limited availability of instruments. Currently, the New Technologies subcommittee has fulfilled all of its obligations from the FY 2008-09 workplan to investigate new anion technology and with no clear options on the horizon; the subcommittee will be reactivated when the need to investigate new technologies arises.

With the completion in FY 2008-09 of a draft on the long-term trends of organic carbon and bromide data, staff will focus in FY 2009-10 on getting this data published so the results are available to a wider audience. In addition to a journal publication on long term trends in organic carbon and bromide, staff will also begin the evaluation of the long term trends associated with salinity and nutrients.

As mentioned in the beginning of this document, some of the tasks associated with the 2006 Sanitary Survey Update are associated with groups outside of MWQI. These tasks are included in this workplan as a guide to their progress but are not related managerially to the MWQI program. These projects are indicated with a (SS) in the column labeled "participants." Unless there is a direct connection to the MWQI program through the BCP positions, accomplishments associated with these projects are as a result of the ongoing efforts of the group outside of MWQI.

Table 3. MWQI Real time Sampling: station location, parameters, and equipment

Station	Parameters	Equipment
Sacramento River at Hood (HOOD)	TOC, DOC	Shimadzu 4100 – (combustion) Sievers 900 – (oxidation)
San Joaquin River near Vernalis (VERNALIS)	TOC, DOC, bromide, chloride, nitrate, sulfate, fluoride	Shimadzu 4110 – (combustion) Dionex DX 800 – (anions)
Delta P.P. Headworks (BANKS)	TOC, DOC, bromide, chloride, nitrate, sulfate, fluoride	Shimadzu 4100 – (combustion) Dionex DX 800 – (anions)
Jones Pumping Plant	TOC, DOC	Shimadzu 4100 – (combustion)

6.1.1 Real Time Monitoring Deliverables and Timelines

(Lead organization(s) are shown in bold)

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
Continue operation of automated stations at Hood, Banks, and Vernalis & identify critical data gaps.	**MWQI**	na	Ongoing
A) Development of SOPs documenting maintenance, operation and quality assurance/quality control of all in-situ equipment.	**MWQI/ O&M Water Quality (SS)**	July 2008	**A)** MWQI drafts completed by June 2009. Final documents available Fall 2009
B) Work towards standardizing, streamlining, and consolidating DWR's in-situ: equipment, data quality control, and data dissemination.	**b) MWQI O&M Water Quality (SS)** DPLA IEP	July 2008	**B)** Ongoing
Continue training of SLDMWA staff on Shimadzu operation and refine instrument operations as	**MWQI/SLDMWA**	February 2009	Installation completed Dec.2008 Training to begin Feb.

needed at Jones PP.			2009 with ongoing instruction
Installation of real time monitoring instruments at DMC at McCabe Rd. (inlet to O'Neill Forebay).	**O&M Water Quality/SLDMWA** MWQI	na	Identified by MWQI-TAC as low priority compared to Gianelli real-time station. Work on hold pending Gianelli's outcome.
Complete installation of real time WQ stations at Gianelli plant.	**MWQI** O&M Water Quality/SLFD	January 2008	Ongoing
Evaluate the need, and planning for, other installations per the RTDF-CP (together with RTDF Steering Committee).	**RTDF SC** MWQI TAC	July 2008	Ongoing
Provide readily accessible data and fill in TDS/EC data gaps on pump-in activities.	**O&M WQ (SS)**	July 2008	Ongoing
Pursue alternative strategies for debris removal at Vernalis station.	**MWQI**	na	Potentially June 2010, but low priority given installation of new stations
Submittal of organic carbon and bromide long term trends report in peer reviewed journal	**MWQI**	July 2008	September 2009
Analysis of long term trends for EC and nutrients	**MWQI**	April 2009	September 2009-finish analysis December 2009-submit to journal for publication,

na = not applicable or available

6.2 RTDF-CP-Water Quality Forecasting

Water quality monitoring enables an understanding of current and past water quality conditions, however, it is generally inadequate to forecast and assess the water quality effects of future, or proposed, changes in the Delta and SWP. To enable future conditions to be forecasted and analyzed, this element uses monitoring data in conjunction with mathematical modeling techniques to develop and refine computer simulation tools. The goal to produce weekly DOC forecasts for the Delta and the Aqueduct by the end of FY 2009-10, however this is dependent on development of the WARMF model by CUWA. Note that as the DSM2 model is improved by upgrades or recalibrations, the most current, vetted, version of the model will be used for forecasting purposes.

To achieve the tasks described below requires the continued collaboration between the various DWR groups responsible for real time data collection and forecasting. These groups include the MWQI Program, O & M's OCO and the Bay Delta Office's Delta Modeling Section. Objectives of this enhanced effort are to better tailor water quality monitoring to modeling needs and to maximize the use of modeling results by water quality managers. The Environmental Scientist position (ES) that was vacated in October 2008 was filled with an ES whose duties include working closely with DWR modelers. As envisioned, some of the responsibilities of this position will be to serve as the link between water quality data and modeling products by analyzing water quality data to understand the Delta as a conveyance system to direct modeling efforts more effectively.

As an addendum to the FY 2008-09 workplan; after the 1st deployment of the Smart Oranges in August 2008, recovery results suggested a dye study was required to confirm that the movement of the Smart Oranges was representative of the water flow patterns in the aqueduct. In addition, the next scheduled release of the Smart Oranges, in the winter of 2009, would have covered water movement down the aqueduct between Check 13 and Edmonston. This release would have occurred when flows through Edmonston represented only pump-in contributions. Therefore, in February 2009, a meeting was held between MWQI and MWD and the SWC consultant to determine revisions to the FY 2008-09 workplan tasks and timelines. Due to the mid-year change in the project, these changes are reflected in this workplan and reflect some deliverables and timelines that fall within the 2008-09 fiscal year.

6.2.1 Water Quality Forecasting Deliverables and Timelines

(Lead organization(s) are shown in bold)

The tasks in this section require many steps. Detailed steps associated with the tasks below are itemized

Table 4. Develop capability to simulate historical water quality conditions from 1990 to present for Aqueduct model and maintain historical updates for DSM2.

This requires collecting and processing and filling in missing flow data, water quality data, and data on project operations, running the simulation, comparing results to field data, and investigating sources of error in the results.

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
A) Develop ability to simulate historical **Delta** hydrodynamics and water quality (EC, bromide, DOC & fingerprints from 1990 to present.			
1) Gather data from 1990 to present.	**A1) Delta Modeling/OCO**	**A1)** na	**A1)** completed
2) Fill in missing data.	**A2) Delta Modeling/OCO**	A2) na	**A2)** completed
3) Finalize historical simulation from 1990 to present.	**A3) Delta Modeling/OCO**	A3) na	**A3)** completed
4) Develop tools to allow for near immediate update of historical simulation.	**A4) Delta Modeling/OCO**	A4) na	**A4)** completed
5) Maintain historical simulation through monthly updates.	**A5) OCO**	A5) na	**A5)** Ongoing
B) Develop ability to simulate historical **Aqueduct** hydronamics and water quality (EC, bromide, DOC & fingerprints from 1990 to present.			
1) Gather data from 1990 to present.	**B1) OCO-hydraulics/MWQI water quality**	**B1)** May 2009	**B1)** Sept. 2009
2) Fill in missing data.	**B2) Bay Delta Modeling/OCO/MWQI**	**B2)** May 2009	**B2)** Nov . 2009

3) Finalize historical simulation from 1990 to present.	**B3) Bay Delta Modeling/OCO**	**B3)** Dec. 2009	**B3)** Jan. 2010
4) Develop tools to allow for near immediate update of historical simulation.	**B4) Bay Delta Modeling/OCO**	**B4)** Feb 2010	**B4)** May 2010
5) Maintain historical simulation through monthly updates.	**B5) OCO**	**B5)** June 2010	**B5)** ongoing

na = not applicable or available

Table 5. Develop capability to conduct planning studies of Delta and Aqueduct water quality

A planning study requires the generation of boundary conditions and project operations under an assumed hydrology, water demands, institutional constraints, and project operation goals.

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
A) Enable Delta planning studies 1) EC: develop, test, and refine methods to estimate boundary values given assumed upstream flows (quantity and source), land practices, and operations.	**Bay-Delta Modeling**	**A1)** na	**A1)** Pending bond funding, capability being developed by Systech through CUWA
2) Bromide: develop, test, and refine methods to estimate boundary values given assumed upstream flows (quantity and source), land practices, and operations.	**Bay-Delta Modeling**	**A2)** na	**A2)** June 2009-Note that simulating bromide directly contingent upon a recalibration of DSM2.
3) DOC: develop, test, and refine methods to estimate boundary values given assumed upstream flows (quantity and source), land practices, and operations.	**Bay-Delta Modeling**	**A3)** na	**A3)** Pending bond funding, capability being developed by Systech through CUWA

B) Enable Aqueduct planning studies 1) For EC, bromide, DOC & fingerprinting: develop, test, and refine methods to estimate boundary values given assumed upstream flows (quantity and source), land practices, and operations.	**Bay-Delta Modeling**	**B1)** January 2010	**B1)** June 2010

na = not applicable or available

Table 6. Develop capability to produce seasonal forecasts

Seasonal forecasts typically extend several months out and require establishing boundary water quality conditions and operations given forecasted system flows.

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
Enable Delta seasonal forecasts **A)** EC and bromide: develop, test, and refine methods to forecast boundary values given forecasted upstream flows (quantity and source), land practices, and operations.	**Bay Delta Modeling/OCO**	**A)** na	**A)** Pending bond funding, capability being developed by Systech through CUWA. Note that simulating bromide directly contingent upon a recalibration of DSM2.
B) DOC: develop, test, and refine methods to forecast boundary values given forecasted upstream flows (quantity and source), land practices, and operations.	**Bay-Delta Modeling/ OCO**	**B)** na	**B)** Pending bond funding, capability being developed by Systech through CUWA.
C) Volumetric fingerprints	**Bay-Delta Modeling/ OCO**	**C)** January 2009	**C)** June 2009
Enable Aqueduct seasonal forecasts. **D)** EC and bromide: develop, test, and refine methods to forecast boundary values given forecasted upstream flows (quantity and source), land practices, and operations.	**Bay Delta Modeling/OCO**	**D)** na	**D)** September 2009- Note that simulating bromide directly contingent upon a recalibration of DSM2.

E) DOC: develop, test, and refine methods to forecast boundary values given forecasted upstream flows (quantity and source), land practices, and operations.	**Bay Delta Modeling/OCO**	**E)** na	**E)** TBD-Dependent on completion of task immediately above.
F) Volumetric fingerprints	**Bay Delta Modeling/OCO**	**F)** January 2009	**F)** December 2009

na = not applicable or available

Table 7. Develop capability to produce weekly Aqueduct forecasts

Producing weekly forecasts requires establishing an accurate description of initial system water quality/fingerprint, capturing relevant recent historical and forecasted data from various sources, and applying some type of quality assessment to this data.

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
A) Evaluate CH2MHill's recommendations for adapting DSM2 Aqueduct model from planning mode to forecasting mode and refine/revise the recommendations as needed.	**Bay-Delta Modeling** /OCO	**A)** July 2008	**A)** October 2009
B) Troubleshoot and implement revised recommendations to migrate DSM2 Aqueduct Model from seasonal forecast modes to weekly forecast mode. 1. EC 2. bromide 3. DOC 4. fingerprints	**Bay-Delta Modeling** /OCO	**B)** July 2008	**B)** June 2010

Table 8. Assess and improve/develop preprocessing tools (computer programs, Python codes, Excel Templates/Macros, etc.) to enable fast, reliable forecasts of EC, DOC, and bromide with DSM2 and the Aqueduct model (i.e. move from manual to automatic processing)

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
A) Evaluate current methods/procedures/tools for retrieving raw data, quality assurance/ quality checking (QA/QC) of raw data, processing raw data into model input (HEC-DSS) format, and running DSM2 for multiple scenarios.	**Bay-Delta Modeling/OCO**	**A)** July 2010	**A)** 2010/11 workplan
B) Identify and list the preprocessing steps, and identify all the required data sources for DSM2 and the Aqueduct model.	**Bay-Delta Modeling/OCO**	**B)** July 2010	**B)** 2010/11 workplan
C) Improve/develop better, faster tools to automatically retrieve raw data from DSM2 (flow, stage, EC, Br, DOC, operations – Clifton Court Forebay, Jones Pumping Plant, South Delta Barriers, Suisun Marsh Control Gates, etc.) and for the Aqueduct model (diversions at the aqueduct turn-outs, flow in and out of O'Neil Forebay to San Luis Reservoir, etc.) from various data sources.	**Bay-Delta Modeling/OCO**	**C)** July 2010	**C)** 2010/11 workplan
D) Improve/develop better, faster tools to automatically process raw data and put those into model input (HEC-DSS) format.	**Bay-Delta Modeling**	**D)** July 2010	**D)** 2010/11 workplan
E) Improve/develop tools to automatically run the model for multiple scenarios or alternatives.	**Bay-Delta Modeling**	**E)** July 2010	**E)** 2010/11 workplan

Table 9. Assess and improve/develop post-processing tools (computer programs, Python codes, Excel Templates/Macros, etc.) to enable fast, reliable assessment of results from DSM2 and the Aqueduct model (forecasts of EC, DOC, and bromide, etc.) for alternative scenarios.

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
A) Evaluate current methods/procedures/tools used for DSM2 for retrieving and post processing model results (HEC-DSS format) and putting the results in summary tables, charts, etc. in Excel.	**Bay-Delta Modeling/OCO**	**A**) na	**A)** 2011/12 workplan
B) Identify and list types of tables and graphs that will be useful for assessing the model results and facilitate evaluation of alternative scenarios. (i.e. improve user friendliness through feedback from the end user on displays and tools).	**Bay-Delta Modeling/OCO** RTDF Steering Committee	**B)** na	**B)** Ongoing
C) Improve/develop better, faster tools (Excel Macros, etc.) to automatically retrieve model results (flow, stage, EC, Br, DOC, etc.) from the model output (HEC-DSS) format into Excel.	**Bay-Delta Modeling/OCO**	**C)** na	**C)** 2011/12 workplan
D) Improve/develop better Excel Templates/Macros to automatically generate summary tables, graphs etc. for multiple scenarios to enable assessment of alternatives.	**Bay-Delta Modeling/OCO**	**D)** na	**D)** 2011/12 workplan
E) Develop animation tools to illustrate Delta water Quality variation with time.	**Bay-Delta Modeling**	**E)** na	**E)** 2011/12 workplan
F) Enhance presentation of weekly (monthly?) volumetric and constituent "fingerprints" results through development of new visualization tools.	**Bay-Delta Modeling**	**F)** July 2009	**F)** June 2010

na = not applicable or available

Table 10. Enhance forecasting procedures

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
A) Improve characterization of initial conditions for EC forecasts: Implement a procedure to allow better interpretation of results with respect to Delta-wide conditions and historical EC patterns and thus improve characterization of initial EC conditions in the Delta.	**Bay-Delta Modeling** OCO	**A)** na	**A)** June 2010, however other items will take 1st priority over this task.
B) Improve Delta Island Consumptive Use characterization for forecasting (DTAU model).	**Bay-Delta Modeling/OCO**	**B)** na	**B)** Ongoing task independent of MWQI workplan.
C) Develop method for generating report of historical simulation at some given interval of time, perhaps yearly.	**Bay-Delta Modeling/OCO**	**C)** na	**C)** June 2010

na = not applicable or available

Table 11. Conduct SWP Particle Tracking Study to assist in validation of the Aqueduct model (Smart Oranges study)

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
A) Production of draft report summarizing 1st deployment results and detailed study plan for 2nd deployment and dye study.	**MWQI**	**A)** January 2009	**A)** June 2009
B) Preparation of 2nd set of Smart Oranges.	**MWQI**	**B)** January 2009	**B)** June 2009
C) Coordination with DWR OCO to optimize release with optimum SWP flow conditions.	**MWQI**	**C)** January 2009	**C)** March 2009-June 2009
D) Reconfigure sondes for Rhodamine WT dye and test equipment.	**MWQI**	**D)** February 2009	**D)** March 2009-June 2009
E) Notify and receive approval from all impacted O & M and municipal facilities.	**MWQI**	**E)** February 2009	**E)** March 2009-July 2009

F) Conduct dye study and 2nd release of Smart Oranges.	**MWQI**	**F)** July 2009-September 2009	**F)** July 2009-September 2009
G) Prepare final report.	**MWQI**	**G)** October 2009	**G)** January 2010

Table 12. Staff Training

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
A) Have current staff trained to run models for all modes of forecasting and historical simulations.	**Bay-Delta Modeling/OCO**	**A)** na	**A)** Ongoing
B) Maintain training as new versions of model become available.	**Bay-Delta Modeling/OCO**	**B)** na	**B)** Ongoing

na= not applicable or available

6.3 RTDF-CP-Information Management and Dissemination

Within this program element, there are information management and data dissemination tasks associated with grab sample and real time data. Grab sample data is stored in the California Water Data Library (WDL) which encompasses DWR programs beyond MWQI (http://wdl.water.ca.gov/). The website is administered through DWR's Division of Planning and Local Assistance. Real time data from MWQI's real time monitoring stations are stored on a MWQI server and posted on DWR's California Data Exchange Center (CDEC) and the MWQI web site.

Information management and dissemination tasks are associated with mechanisms that allow real time analytical data and modeled forecasting data to be packaged into a user friendly product for end users. Tasks under this program element include: continued refinement of the California Water Data Library (i.e. fully accessible historical MWQI data, repository for O&M Water Quality and MWQI water quality data, and development of a web interface and interactive map for users), database management for delivery of real-time data, continued development and enhancement of online tools for evaluating and interpreting MWQI water quality data (scientific visualization), development of means to distribute weekly water quality reports via the Internet, and database development for storage and management of real time data.

6.3.1 Information Management and Data Dissemination Deliverables and Timelines

(Lead organization(s) are shown in bold)

Task	Participants	Estimated Start Date	Estimated Completion Date
Import selected contract lab data into the WDL.	O & M WQ Northern District MWQI Program	July 2008	For O& M, June 2010.
Improve/Upgrade database infrastructure This task includes:	**MWQI Program**		
A) Determine if DWR will allow usage of a SQL server database and migrating Access database and routines to SQL server.		**A)** January 2009	**A)** Ongoing
B) Simplify and consolidate into one database existing separate databases (OC, anions) and routine automated data transfer procedures.		**B)** January 2009	**B)** April 2009
C) Simplify and consolidate routine, automated data transfer procedures		**C)** January 2009	**C)** May 2009
D) Implement adequate backup and restoration capabilities, including testing of capabilities.		**D)** January 2009	**D)** February 2009
E) Enhancing database security		**E)** January 2009	**E)** April 2009
F) Enhance routine, automated QA/QC processes to the database (takes the place of Aquarius).		**F)** January 2009	**F)** April 2009
G) Add error handling and logging to routine, automated processes.		**G)** January 2009	**G)** August 2009/ongoing
H) Identify retention and archival needs and formulate handling procedures.		**H)** January 2009	**H)** March 2009
I) Continue to develop desktop data management tools.		**I)** July 2008	**I)** Ongoing

J) Document and maintain infrastructure.		**J)** July 2009	**J)** Ongoing
Improve Field Data Communications. This task includes: **A)** Work to eliminate use of Corsica and transfer its functions to Einstein/Heisenberg. **B)** Enable internet connection with carbon analyzers at Banks and Vernalis. Assess the feasibility of using cellular (air card) internet connections with Hood and Jones rather than dial up.	**MWQI Program**	 **A)** February 2009 **B)** May 2009	 **A)** Ongoing **B)** Ongoing
Continue to enhance and improve water quality report delivered to stakeholders **A)** Weekly water quality reports distributed to users via e-mail and the Internet (MWQI website). **B)** Migrate from a weekly water quality report to a daily web based report 1) Create web-based mock-up of daily report following DWR guidelines and including a convenient 1 page summary sheet for managers. 2) Determine if DWR will allow MWQI to upload daily web updates as an automated system. 3) Determine internal MWQI process needed for daily web updates	**MWQI Program** **MWQI Program**/RTDF Steering Committee	 **A)** January 2004 **B1)** na **B2)** January 2009 **B3)** January 2009	 **A)** Ongoing **B1)** Mockup completed in old DWR web based formatting. Need to create for new DWR web based format which goes online May 2009. **B2)** Ongoing **B3)** September 2009
Refine QA/QC post processing capabilities using Aquarius software	**MWQI Program**	na	Ongoing

Provide timely access to current QA/QC'd SWP operations data i.e. conduct QA/QC on historical data and remove inconsistencies and gaps.	**OCO**/Office of Reconciliations & CH2MHill	na	Ongoing
Incorporation of new stations real time data into CDEC and weekly report.	**MWQI Program**	na	Ongoing

na = not applicable or available

7 SCIENCE SUPPORT (SPECIAL STUDIES)

The many natural and anthropogenic processes that affect drinking water quality in the Delta, its tributaries, and the State Water Project remain poorly understood. To further improve DWR's ability to measure and forecast drinking water quality of water delivered to its customers, MWQI engages in special studies that focus on specific aspects of source waters, contaminant loading, measurement methods and instrumentation, and climate and hydrology. Results of these studies inform subsequent cycles of the MWQI workplan by improving the RTDF and discrete sampling programs.

In this workplan cycle a number of special studies are either ongoing and continue forward from the 2008-09 workplan or have completed their fact-finding phase and have evolved into the projects outlined in this workplan. The N-Nitroso-dimethylamine (NDMA) special study is ongoing with no changes from FY 2008-09. Background investigations associated with the urban runoff, discharges of drinking water constituents of concern into the South Delta, and the circulation study in O'Neill Forebay projects have been completed. Based on these investigations, the projects have evolved into the plans discussed in this section. New special studies to this workplan are: 1) additional data collection for the improvement of organic carbon boundary conditions in the Delta; 2) spectrofluorometer analysis work; and 3) the water quality compendium project. Summaries of the different studies within the Special Studies Element are discussed below. Budget requirements for each study are listed in Section 4 of this workplan under Program Funding Needs. More detailed original, or modified proposals are presented, as appropriate in Appendix3.

7.1 Urban Sources and Loads Investigation--Lead Investigator: Rachel Pisor

This is an ongoing study begun in the FY 2008-09 workplan. Appendix 3 contains the detailed proposal for the FY 2009-10 workplan and the original FY 2008-09 proposal for this study.

Runoff from urbanization of Delta watersheds is a concern due to impacts to drinking water quality. A study of urban loads conducted by MWQI of the Steelhead Creek watershed showed significant impacts to drinking water quality and demonstrated the importance of tracking urban runoff throughout the Delta as it continues to urbanize.

In the FY 2008-09 workplan, MWQI began investigating the feasibility of conducting another urban drainage study. After analyzing a number of factors including access, cooperation of cities, etc., the City of Lathrop was chosen as a suitable candidate for another urban runoff investigation.

This study has the advantage of focusing on the impact of urban drainage into the San Joaquin River, whereas the previous MWQI Steelhead Creek study focused on urban runoff into the Sacramento River. The city of Stockton is the largest discharger into the San Joaquin River; however, due to geographic distribution of the runoffs and the inability to separate agricultural discharges from urban discharges, the city was not chosen for this study. Although smaller, the city of Lathrop provides an easy to understand urban system that discharges directly into the San Joaquin River. Like portions of the Steelhead Creek urban area, Lathrop was a rapidly urbanizing city until the recent housing and financial crisis. Results from this study will provide a baseline for an area which will continue to urbanize once the financial climate improves. Like Steelhead Creek, this will allow future studies to revisit and reassess the impacts of urban growth as the city continues to expand. It is anticipated that once this study has been completed, population growth indicators will periodically be evaluated to determine when the next urban runoff study should be conducted (potentially 3- 5 years after the end of the baseline study).

The study at Lathrop will be conducted starting at the first storm event of the 2009-2010 wet season. Storm event samples will be taken along the San Joaquin River, Old River and in the pumping stations within Lathrop. Constituents that will be monitored include minerals, metals, pesticides, total and dissolved organic carbon, bromide, bacteria, turbidity, total dissolved and suspended solids, UVA_{254} and total trihalomethane formation potential. A baseline GIS analysis will determine current land use patterns. This baseline will be used in future analyses of land use and water quality to correlate changes in land use with changes in water quality. This study will be conducted for at least two consecutive years. A detailed proposal is given in Appendix 3.

7.1.1 Urban Investigations Deliverables and Timelines

Deliverables	Participants	Estimated Start Date	Estimated Completion Date
Storm event sampling at 12 sites in the Lathrop study area	**MWQI Program MWQI Field Group**	Winter 2009	September 2011
Analysis of samples as indicated above by DWR	**Bryte Laboratory**	Winter 2009	October 2011
Final Report	**MWQI Program**	November 2011	June 2012

7.2 Sources, Fate, and Transport of Nitrosamines and their Precursors in the Sacramento-San Joaquin Delta and the State Water Project--Lead Investigator: Carol DiGiorgio and MWDSC

This is an ongoing study begun in the FY 2008-09 workplan. Appendix 3contains the original FY 2008-09 proposal for this study. Nitrosamines are highly carcinogenic compounds with cancer potentials much higher than that of trihalomethanes (THMs). Historically, nitrosamine concerns have centered on food products. More recently, interest has focused on drinking water—especially effluent-impacted supplies, as surface waters used for drinking water that are downstream of wastewater treatment plants (WWTPs) may contain the carcinogenic compounds themselves, or the precursors necessary to form nitrosamines.

Because of their extreme toxicity, their likely potential to become regulated in the future, and the fact that no assessment of the occurrence of nitrosamines or the nitrosamine formation potential of Delta waters has ever been undertaken, MWQI began a cost share special study with Metropolitan Water District of Southern California that would: 1) identify and quantify some of the potential sources of nitrosamines and their precursors at a number of key points in the Delta (i.e., sample upstream and downstream of potential point sources), and 2) examine the fate and transport of nitrosamines (which can undergo photolysis depending on the depth of the photic zone) and their precursors (which can be biodegraded to some extent in a river) in the Delta. Sampling began in July 2008 and will end in July 2010.

7.2.1 NDMA Deliverables and Timelines

Deliverables	Participants	Estimated Start Date	Estimated Completion Date
Quarterly sampling at 7 sites in the Sacramento-San Joaquin Delta	MWQI staff MWQI Field Group	July 2008	July 2010
Analysis of all samples as indicated above by both DWR and MWDSC	Bryte Laboratory MWDSC Laboratory	July 2008	August 2010
Final Report	MWQI staff MWDSC staff	August 2010	December 2010
Paper for Publication	MWQI staff MWDSC staff	January 2011	Submitted March 2011

7.3 Understanding the Effects of Agricultural and Other Discharges to Salinity in the South Old River and Paradise Cut--Lead Investigator: Carol DiGiorgio

This study replaces an ongoing study begun in the FY 2008-09 workplan entitled Feasibility of Estimating Mass Loads of TDS, Organic Carbon, and Nutrients Discharged from a South Delta Agricultural Island. Appendix 3 contains the original proposal for this study. Pending input from modelers and/or the State Water Resources Control Board (SWRCB), this study will be completed in this FY 2009-10 workplan.

This project was originally undertaken to gather additional data for the Delta Island Consumptive Use (DICU) model in the South Delta. The Department is under a Cease and Desist order from the SWRCB since it is unable to consistently meet water quality standards at the South Old River at Tracy Road Bridge compliance point in the South Delta. Modeling studies of the area are compromised because of the lack of good agricultural discharge data in the area. The purpose of the study was to gather flow and analyte information from one or more agricultural discharge points in the South Delta to be used to refine the DICU model. Investigations in FY 2008-09 were conducted to determine if there was a suitable site for instrument installation and whether a cooperative landowner could be located. MWQI staff located 2 candidate locations; 1) a drop structure inlet into Sugar Cut and 2) an unnamed agricultural drain approximately 0.25 miles upstream of the South Old River Tracy Road compliance point. Landowner cooperation is still questionable. Staff also completed a report documenting data used to create the monthly salinity estimations used by the DICU model. This report is being included in a larger report to be published by the Bay-Delta Office, Delta Modeling Branch in 2009.

In lieu of locating a cooperative landowner, MWQI has begun a cooperative study to examine the timing and influences of agricultural and other discharges on conductivity in the South Old River and Paradise Cut. MWQI is working with O & M Water Quality and DWR's Central District to complete this year-long survey of discharges. The study began in December 2008. A survey of the South Old River and Paradise Cut is made by boat approximately every 2 weeks during the ebb flow of the tidal cycle. A YSI sonde, outfitted with an electrical conductivity probe, and a GPS unit, collects EC data every 1 second. Since EC data is directly linked to GPS coordinate data and all observed discharge points are inputted into the GPS unit, changes in salinity from discharge locations are easily displayed using GIS software. Several meetings have already occurred between MWQI staff, DWR modelers and DWR staff directly involved with negotiations with the SWRCB. This data will be used by DWR modelers to refine the DICU and DSM2 models outputs of discharge in the South Delta. Although this study does not allow for

the calculations of loads and does not collect data continuously or data on organic carbon and nutrients, this cooperative study provides similar salinity information to the study first proposed by MWQI.

7.3.1 Understanding the Effects of Discharges in South Old River and Paradise Cut Deliverables and Timelines

Deliverables	Participants	Estimated Start Date	Estimated Completion Date
Conduct pilot study of equipment and data analysis tools.	**MWQI/O & M Water Quality/Central District**	December 2008-January 2009	February 2009
Conduct biweekly boat surveys of the South Old River and Paradise Cut	**MWQI/O & M Water Quality/Central District**	February 2009	February 2010
Produce final report and GIS visualization products	**MWQI/O & M Water Quality/**	March 2010	June 2010

7.4 Investigation of O'Neill Forebay water circulation--Lead Investigator: Jason Moore/Ted Swift

This study replaces an ongoing study of the same title begun in the FY 2008-09 workplan. Appendix 3 contains the original proposal for this study which proposed using underwater drifters to determine the mixing behavior of water bodies from different source waters entering into O'Neill Forebay (i.e. California Aqueduct at Check 12, O'Neill intake from the Delta Mendota Canal, and Gianelli Pumping/Generating (P/G) Plant from the San Luis Reservoir). One important question this study will address is whether water discharged into the Forebay from the Delta Mendota Canal (DMC) fails to mix with Forebay water and instead flows downstream directly to Check 13 (short circuiting). It was determined that using drifters would not answer this question. Therefore, this study has adopted a phased approach using available historical data to conduct a paper based, data analysis of mixing based on EC readings at input and output locations to the Forebay. Depending on the historical investigation, this project may progress to examining real-time data or considering direct measurements of short-circuiting via a boat in the forebay.

The first phase of data analysis uses available historical data to assess if there is short circuiting occurring in the forebay. EC data will be analyzed to find any patterns and correlations between the Banks PP, the Delta Mendota Canal station (a historical location located at the headworks of the DMC which will serve as a surrogate for Jones PP), the O'Neill intake and SWP Check 13. To examine the concept of short-

circuiting, historical EC data from the Delta Mendota Canal, located at the Jones PP headworks will be compared to the EC of SWP water entering the forebay from Banks PP. The EC of water leaving the forebay at SWP Check 13 will also be examined. If there is a large difference in EC between CVP and SWP waters, then the EC at SWP Check 13 should give an EC fingerprint indicating whether the largest source of ions is from the SWP or the CVP. If the CVP is shown to have a greater influence on EC at SWP Check 13 than the SWP, then it would indicate the presence of a short circuiting effect.

To better understand the dynamics of EC in this system, the situation when water is withdrawn from O'Neill Forebay via O'Neill intake will also be examined. The dates of pump-ins to the Forebay and withdrawals from the Forebay at O'Neill intake are known since 2004. Data will be examined to see if EC at the O'Neill intake reflects SWP water quality when there is no pumping or only generating occurring at the O'Neill intake.

Note that releases of water from San Luis Reservoir at Gianelli pumping plant could potentially influence the EC fingerprint at SWP Check 13, therefore a second phase of this study proposes to examine real time EC data from real-time stations located at Banks PP, Jones PP, SWP Check 13 and the new station to potentially be installed at the Gianelli P/G plant. The second phase of this study is dependent on the placement of a real-time EC sensor in the Forebay of the Gianelli plant and the results from the first phase of this study which would determine if this approach was feasible. If short-circuiting patterns cannot be observed with historical data, then using real-time data, including data from Gianelli would probably not provide the information required and a real-time data analysis approach would potentially not be pursued.. Thus the first phase of this study will assist the MWQI Program and the SWCs in assigning priority to the potential future task of determining the hydrodynamics of O'Neill Forebay.

If the historical data analysis indicated short-circuiting, then, real time EC data would be collected from Banks PP, the Jones PP, O'Neill intake and SWP Check 13, once the Gianelli PP WQ station was operational ,for a minimum of one year, Data would be analyzed in a manner similar to the historical data analysis. In conjunction with the above data analysis, staff would also investigate the feasibility of running transects in the Forebay using a boat and GPS linked YSI sonde unit with an EC probe to determine if short circuiting of Delta Mendota water was occurring in the Forebay. Like the EC study of the South Delta, a GIS interface would be used to provide a graphical representation of the sources and patterns of water throughout the Forebay. Sharp changes in EC during certain operations would confirm the short-circuiting effect. The study would occur monthly for 12 months, although less frequent bimonthly surveys could be substituted due to budgetary or time constraints. This study would require

funding for boat time and a boat operator. If this approach ultimately appears as a viable option, MWQI would summarize the dollar amounts involved and discuss with the MWQI-TAC the feasibility of using funding for this project.

7.4.1 O'Neill Forebay Circulation Deliverables and Timelines

Deliverables	Participants	Estimated Start Date	Estimated Completion Date
Analyze historical EC patterns at Banks PP, Delta Mendota Canal station, O'Neill Intake, and SWP Check 13	**MWQI Program**	April 2009	Sept 2009
Monitor and analyze real-time data from Gianelli P/G, Banks PP, Jones PP and Check 13	**MWQI Program**	Start date dependent on installation of EC meter at Gianelli P/G Plant	Completion date dependent on installation of EC meters at Gianelli Pumping Plant, however, after 1 year of data collection, decide on additional study or produce report of findings.
Investigate feasibility of sonde study of the O'Neill Forebay	**MWQI Program**	February 2009	July 2009

na = not applicable or available

7.5 Update of Water Quality Compendium--Lead Investigator: Jason Moore

This study is a new study in the FY 2009-10 workplan; however, preliminary efforts were started during the FY 2008-09 workplan cycle. In November 2007, a Memorandum of Understanding was signed between the Resources Agency and CalEPA establishing the California Water Quality Monitoring Council (Council) as required by SB 1070. The legislation required the Council to maximize the efficiency and the dissemination of water quality data that is collected in the State. As part of that effort, the Council will need to document all water quality sampling conducted by the different state agencies, including DWR. The State Water Resources Control Board, the Central Valley Regional Water Quality Control and CALFED are also working towards the goal of compiling regional and statewide monitoring information and plan to submit their documents to the Council. Various agency staff have approached MWQI for information about this program and other DWR water sampling programs. Currently, it is unclear if these agencies will produce a document that will also be useful to DWR as a standalone product detailing all the Department's water sampling efforts.

The purpose of this study is to work with the different agencies developing documents and/or websites of water quality activities in the Delta and the Sacramento and San Joaquin watersheds and potentially provide a linkage between water quality sampling studies in the Department and the agencies seeking this information including addressing the Council's needs as appropriate. The MWQI Program is housed in the Office of Water Quality which was created to facilitate greater linkage among existing DWR water quality programs, making MWQI ideally situated to coordinate efforts within the Department and between agencies. This is an evolving project that will be based on whether products submitted to the Council meets DWR's needs for a standalone document detailing all the Department's water quality sampling. If not, then in addition to facilitating information needs between DWR water sampling groups, other agencies, and the Council, MWQI will also produce a paper based and web based product that documents the locations and constituents monitored at all DWR water quality monitoring sites. This project ultimately serves to meet the goals of the RTDF CP for better coordination and collaboration of DWR water quality monitoring groups and hopefully, towards eventually standardization of monitoring methods and data management and dissemination.

7.5.1 Compendium Deliverables and Timelines

Deliverables	Participants	Estimated Start Date	Estimated Completion Date
Serve as the information link between DWR water quality sampling groups and State and Regional Board requests for sampling information fulfill the information needs of the Water Quality Monitoring Council.	**MWQI Program**	January 2009	Ongoing
Based on the product created for the Water Quality Monitoring Council, produce an internal DWR paper and web based document that summarizes all DWR water quality monitoring.	**MWQI Program**	na	Completion date dependent on identification of task needs from above. May require up to 2 years if Steve Ford reviews are required and DTS services are required.

na = not applicable or available

7.6 DSM2 Boundary Improvement & Model Recalibration Study for Dissolved Organic Carbon--Lead Investigator: Joe Christen

This study is a new study in the FY 2009-10 workplan; however, it was started in December 2008 during the FY 2008-09 workplan cycle as staff resources were available to implement this study.

This study consists of one year of discreet water quality sampling to provide the Bay-Delta Office Modeling Section with representative water quality data for dissolved organic carbon (DOC) concentrations and ultra-violet absorbance at 254nm (UVA) for boundary conditions currently not well characterized in DSM2. Currently the DSM2 assumed boundary conditions for the East Side Steams and the Yolo Bypass inflow are not developed from representative data. Dissolved organic carbon data from the American River are used as boundary conditions of the east-side tributaries (for example Mokelumne River), and assumptions developed from the Sacramento River are used to represent Yolo Bypass values. Neither set of data are representative of the water quality data they represent.

Besides sample collection from the Yolo Bypass and the Eastside streams, this study will also provide organic carbon data for several locations in the interior Delta. Bay Delta Modelers have indicated that when DSM2 is recalibrated, additional data will be required for their recalibration study, however there are few Delta locations with available data for calibrating DSM2 for carbon simulations.

To address these data gaps discreet sampling will be conducted biweekly for one year at six locations (2 Eastside streams, the Yolo Bypass, and 3 interior Delta stations) Emphasis is given to the collection of organic carbon and UVA data. However samples will also be analyzed for a suite of other parameters including; bromide, conductivity, total dissolved solids, and nutrients. This sampling study is within the MWQI program objectives of model refinement through additional data collection and addresses the RTDF-CP's stated objective of providing support to DWR modeling efforts

7.6.1 Boundary Improvements and Model Recalibration Deliverables and Timelines

Deliverables	Participants	Estimated Start Date	Estimated Completion Date
Collect organic carbon data and provide results to Bay Delta modelers.	**MWQI**	November 2008	December 2009 with potential extension to be determined based on discussion with modelers
Final Report	**MWQI**	January 2010	June 2010

7.7 Spectrofluorometer Study-Lead Investigator: Ted Swift

This study is a new study in the FY 2009-10 workplan. This research was identified as an area of expertise needed by the MWQI Program. The full proposal is given in Appendix 3.

In the Sacramento-San Joaquin River Delta, sources of dissolved and particulate natural organic matter (NOM) include tributary river flows from distinct watersheds, algae and submerged vegetation growth and decay, and organic-rich peat soils. NOM concentrations and characteristics in source waters, ultimately bound for municipal drinking water use, is of great interest to water contractors and water treatment operators because of the disinfection byproducts (DBPs) resulting from water treatment.

In 2007, the DWR QA/QC group acquired a high-performance FluoroMax 4 spectrofluorometer to, among other uses, investigate the usefulness of spectrofluorometric analysis to Delta and Delta source waters. An extensive and growing body of literature (e.g., references in Hudson et al. 2007), strongly suggest that this approach may provide a rapid method or methods of accurately quantifying multiple constituents of concern (COCs) in a single measurement.

This study will evaluate the usefulness of spectrofluorometry as a method of rapidly quantifying constituents of concern COCs such as DOC, algae and organic carbon, and as a method of fingerprinting source waters as they pass through the Delta. This study will examine the feasibility of configuring a spectrofluorometer instrument to operate unattended in real-time monitoring stations. It will also seek to identify distinctive characteristics of Delta source waters to provide water "fingerprints" that would be used to, among other things, validate Delta water quality models. To capture a wide range of organic carbon conditions and source water types while minimizing staff labor and travel costs, samples for analysis will be collected during MWQI's normal monthly field runs. Both the total and dissolved fractions of organic carbon analyzed spectrofluorometerically. UV254 absorbance will also be measured. Split samples will also be analyzed by Bryte Laboratory for TOC, DOC and THMFPs. The 2 methods of analysis will be compared to identify distinctive features in the excitation emission matrix that are highly correlated with characteristics such as DOC and TOC concentration, THMFP, UV254 absorbance, and algal biomass. Analytical tools will include multiple regression, parallel factor analysis, and principle component analysis. Once the method is well characterized, its efficacy as part of the routine monitoring will be presented to the TAC with recommendations

7.7.1 Spectrofluorometer Deliverables and Timelines

Deliverables	Participants	Estimated Start Date	Estimated Completion Date
Approximately monthly sampling at sites in the Delta study area	**MWQI Staff** **MWQI Field Unit**	July 2009	June 2011
Spectrofluometric analysis of raw and filtered water samples	**MWQI Staff**	July 2009	June 2011
Analysis of samples by DWR Bryte Laboratory	**Bryte Laboratory**	July 2009	June 2011
Interim report	**MWQI Staff**	May 2010	July 2010
Final Report	**MWQI Staff**	August 2011	October 2011

7.8 Dual Conveyance System—Analysis of Monitoring Stations—Joe Christen

This is a new information gathering study to be conducted and finished in the FY 2009-10 workplan.

To ensure water supply reliability for ecological, agricultural, municipal and industrial uses, the Delta Vision Blue Ribbon Task Force in December 2008 recommended to the Governor the construction of a dual conveyance system for the Delta comprised of an improved through Delta conveyance and a peripheral canal. Although there are no assurances that this approach will be agreed upon, the steadily building water crisis suggests that unlike the 1980s, some water-related infrastructure will be constructed. If, for example, the construction of a dual conveyance system for the Delta did occur, then changes to existing conveyance structures within the Delta, and the addition of new intake structures would potentially influence preferential flow pathways of water movement through the Delta to the pumps. With different pathways taken by water through and around the Delta, it is prudent for MWQI to anticipate the types of organic carbon monitoring that could be required under a new water infrastructure environment.

This study will examine the organic carbon data available in the WDL along the proposed pathway of an improved through-Delta conveyance system. Changes to the through-Delta conveyance system generate questions such as: 1) are current monitoring stations adequate to characterize organic carbon, and 2) if not, where along the through-Delta conveyance system should new stations be located to adequately characterize carbon inputs to the pumps? Future placement of stations or monitoring locations would be examined with the goal of ultimately capturing all important inputs to the Banks PP to enable accurate

mass balance calculations at Banks (i.e. end members of upper Sacramento River from Colusa Basin Drain to Hood, through Delta conveyance important input points, Peripheral canal and San Joaquin River at Vernalis). With this study, MWQI will be more prepared to begin monitoring studies when new water conveyance infrastructure is in place.

7.8.1 Dual Conveyance Deliverables and Timelines

Deliverables	Participants	Estimated Start Date	Estimated Completion Date
Examine Public Policy Institute of California and the Bay Delta Conservation Plan reports to determine what inputs would potentially become more influential to an improved through-Delta conveyance system due to installation and operation of new intake structures n the Delta and additional permanent and temporary barriers.	**MWQI**	July 2009	PPIC Report-August 2009 BDCP Report-upon completion of recommendations by Water Conveyance Workgroup
Examine WDL data along areas that could become more influential to a through-Delta conveyance system and determine if current stations adequately meet monitoring needs or if alternate or additional locations are required.	**MWQI**	September 2009	January 2010
Produce final report with recommendations for station locations	**MWQI**	February 2010	June 2010

8 EMERGENCY RESPONSE ACTIVITIES

Although a component of the RTDF-CP, this element is broken out separately because its scope goes beyond the program and includes tasks identified in the 2006 Sanitary Survey Update. The goals of this element are to: 1) develop and encourage policies to define the role of drinking water quality in DWR's Emergency Response (ER) actions; 2) incorporate drinking water quality components, (including monitoring and involving the MWQI Program), into DWR's established ER plans; and 3) improve dissemination of drinking water quality information between DWR and other stakeholders (i.e. State Water Project contractors, Department of Public Health, Office of Spill Prevention Response, etc.) during emergency events (Sanitary Survey Action Item).

Currently MWQI has fulfilled the tasks originally set-forth in the FY 2008-09 workplan. A document has been prepared that assesses the effectiveness of DWR's Emergency Response plans in addressing drinking water quality protection during emergency events. MWQI staff have performed a review of the Department's existing emergency response documents to: 1) identify how drinking water quality is addressed by the Department during an emergency; 2) make recommendations as to how drinking water quality can better be addressed within the Department during emergency events; and 3) make recommendations for more effective lines of communication between the Department's emergency response managers, drinking water quality experts, and affected stakeholders during emergency events. Once this document completes an internal editing/approval process, an implementation strategy has been established for moving the ideas in this document forward to establish new policies within the Department. MWQI staff have also created 4 stocked emergency kits for gathering drinking water quality data during an emergency. A manual of how to use the kits was also completed in the FY 2008-09.

Many of the recommendations presented in the MWQI document cannot move forward without approval from DWR upper management to direct the Department's Emergency Management Committee to implement these recommendations. Therefore, until there is approval from DWR upper management, ongoing efforts under this element will include: emergency response meeting attendance, restocking of drinking water quality ER kits, providing emergency assistance for drinking water quality monitoring as requested by emergency responders and assisting the Department's Emergency Management Committee as needed in the development of a Department Drinking Water Quality Emergency Response Plan.

8.1.1 Emergency Response Deliverables and Timelines

Deliverable	Participants	Estimated Start Date	Estimated Completion Date
Identify and review all DWR emergency response plans and processes that should consider potential drinking water quality impacts during an emergency.	**MWQI Program** O&M WQ O&M Field Divisions DPLA	November 2008	Document completed in Dec. 2008 and forwarded to DES management for approval and submittal to DWR Executive Management. Executive Management will determine if recommendations can be implemented through the Department's Emergency Management Committee.
Identify water quality staff and material resources for responding to various emergency scenarios.	DWR Emergency Management Committee (EMC)	November 2008	Ongoing-Dependent on DWR EMC contacting appropriate division heads to direct the assignment of their staff and resources to this effort
Participate in emergency response meetings (i.e. CUWA emergency spill taskforce).	**MWQI program**	November 2008	Ongoing

9 OTHER WATER QUALITY PROGRAM-RELATED ACTIVITIES

MWQI management and staff will continue to attend outside meetings of the following groups as necessary to provide technical input and stay current on issues and activities that could affect drinking water. These groups may include;

CALFED Drinking Water Program

CALFED Water Quality Subcommittee

Central Valley Regional Board's Drinking Water Policy Work Group

CUWA Sewage Spills Work Group

Delta Sustainability Activities

Bay-Delta Conservation Plan

Pelagic Organism Decline Workgroup

San Joaquin River Basin Monitoring Partnership

South Bay Aqueduct Task Force (quarterly meetings)

State Water Resources Control Board

Delta Conveyance

DWR and other agency climate change activities

Special Aquatic Species Workgroups or Meetings (Delta Smelt, Splittail Smelt, Salmon, etc.)

MWQI will continue to coordinate its activities in these areas with the MWQI SPC members as it has done in the past and work with SWPCA to facilitate workshops as called for in the 2006 Sanitary Survey Update Action Plan. MWQI will achieve this through the tasks detailed in this and future workplans and participation in both internal and public forums that are focused on drinking water quality issues.

Along those lines, the Chief of the Division of Environmental Services has requested one staff person from MWQI to participate in meetings and related activities associated with the Department's position on

methyl mercury. This person's staff time will not be charged to MWQI, but to another branch the division examining this issue. Staff will serve as the water quality point person representing the Department's interests. Staff will attend meetings approximately twice a month and serve as the water quality specialist informing the Department's Mercury Coordinator on developments that could affect the Department. As the water quality specialist for this issue, staff will be expected to read technical reports on mercury to keep up with any advances in mercury clean up that would be practical for the Delta. In addition staff will provide information on the types of monitoring being proposed for the Department and will be reviewing and organizing comments to the draft total maximum daily load (TMDL) for mercury in the Delta. If DWR is considered liable, then within a year, staff would help with developing a monitoring plan and determining possible station and sampling locations.

As necessary, MWQI management and staff will also attend meetings associated with storm water and wastewater treatment plant discharge permit renewals and will review EIR/EIS documents for projects with the potential to affect drinking water quality in the Sacramento-San Joaquin Delta.

10 PROGRAM MANAGEMENT

Specific MWQI management tasks for FY 2009-10 for this program element include:

A. Conduct monthly program status teleconferences for members of the MWQI TAC. Provide appropriate program and budget updates during these calls.

B. Coordinate up to two comprehensive program conferences for MWQI TAC participants during the fiscal year, one of which may include a Delta or SWP facility tour for new TAC program participants.

C. Along with MWQI staff, participate in technical meetings of the RTDF-CP Steering Committee, the New Technologies work group and such other subcommittees or working groups as may be formed from time to time to address specific drinking water quality issues that arise.

D. Along with MWQI staff, attend various technical and management meetings, conference and workshops related to drinking water quality issues.

E. Along with MWQI staff, attend relevant CALFED meetings and various workshops including the CALFED Science Conference.

F. Ensure MWQI TAC members continue to receive all draft materials, and members of that committee continue to have the opportunity to participate in any technical meetings of interest.

G. Develop the FY 2010-11 MWQI Program Work Plan.

H. As data becomes available in SAP, finalize MWQI Program budget for FY 2009-10 including identifying needs for the SWPCA Fund. If information is available, begin rough estimates of FY 2010-2011 MWQI budget.

I. Coordinate implementation of the RTDF-CP.

J. Monitor progress on MWQI program elements outlined in workplans.

K. Address personnel and safety related issues for MWQI Program.

11 OTHER REQUIRED PROGRAM COSTS

Description of costs

There are numerous program costs for labor, supplies, equipment and services that are charged to the MWQI Program through SAP, but are not necessarily linked to specific program elements. These are costs that are often divided between all branches in the Division of Environmental Services. These costs often result from Department-required, job related or career advancement activities and tasks. Examples of miscellaneous labor costs include staff time to:

- Attend training
- Attend conferences, workshops, meetings
- Develop and track contracts, purchase orders, training requests, travel expense claims
- Conduct facility maintenance (West Sacramento Field Unit)
- Accommodate other high priority Departmental programs and outside programs with data collection and analysis as directed by management
- Dealing with personnel items
- Write memos and other forms of non-technical communication
- Enter and approve time
- Develop Program budget and other SAP-related tasks

Examples of miscellaneous costs associated with supplies, equipment, general facility maintenance and services include:

- IT support (DWR IT personnel maintaining staff computers, servers)
- IT hardware and software (purchasing staff computers, mandatory software)
- Office equipment maintenance (copy and fax machines)
- Office supplies
- Janitorial services
- Moving and general facility services
- Staff training (required and job related)
- Travel costs for meetings, conferences
- Registration costs for mandatory conferences (Environmental Scientists workshop)
- Out-of-State travel costs for conferences, meetings, workshops

- Vehicle maintenance, operation, fuel
- Uniform allowance (shoes, sun glasses)

12 CHALLENGES AND OPPORTUNITIES

The following is a description of challenges and opportunities associated with management of the MWQI Program.

DWR Staffing and State Budget Actions

Due to the ongoing budget crisis in California, all DWR employees, beginning February 2009 and continuing for 17 months through June 2010, are furloughed from State Service for 2 days a month. Although some flexibility has been built into when furloughed days may be used, it is anticipated that to continue to meet goals and deadlines, the effects of this work stoppage will require creative adjustments. Although there is no desire for delays, until the full effects of the furloughs are realized, deadlines may have to become more flexible or the number of meetings reduced and/or lengths expanded to meet several previously individual meeting requirements. DWR travel to and from meetings has also been severely curtailed, and several SWP contractors have indicated that travel is becoming an issue within their agencies. Until budget issues improve, this may necessitate fewer face to face meetings. Currently, there is no information on how State budget issues will impact hiring for the MWQI Program in FY 2009-10. Because of the continuing need for a full-time IT person, MWQI will monitor the success of another DES unit's newly created IT position that organizationally resides within DWR's IT section but with duties associated with the DES unit providing funding. If this arrangement proves successful, it is anticipated that a future MWQI vacancy would be reclassified to an IT position operationally housed within the Department's IT section but with duties assigned by MWQI. The challenge of retention and future recruitment still remains especially in light of salary discrepancies for State scientists.

DWR Overhead Rates

Overhead rates for the Department continue to rise steadily with each new fiscal year. Hourly rates for permanent staff currently used in this workplan may not accurately reflect predicted increases for FY 2009-10. As overhead rates increase and the scopes of the MWQI Program and RTDF-CP broaden, adjustments to the overall program budget may need to be made on an annual cycle.

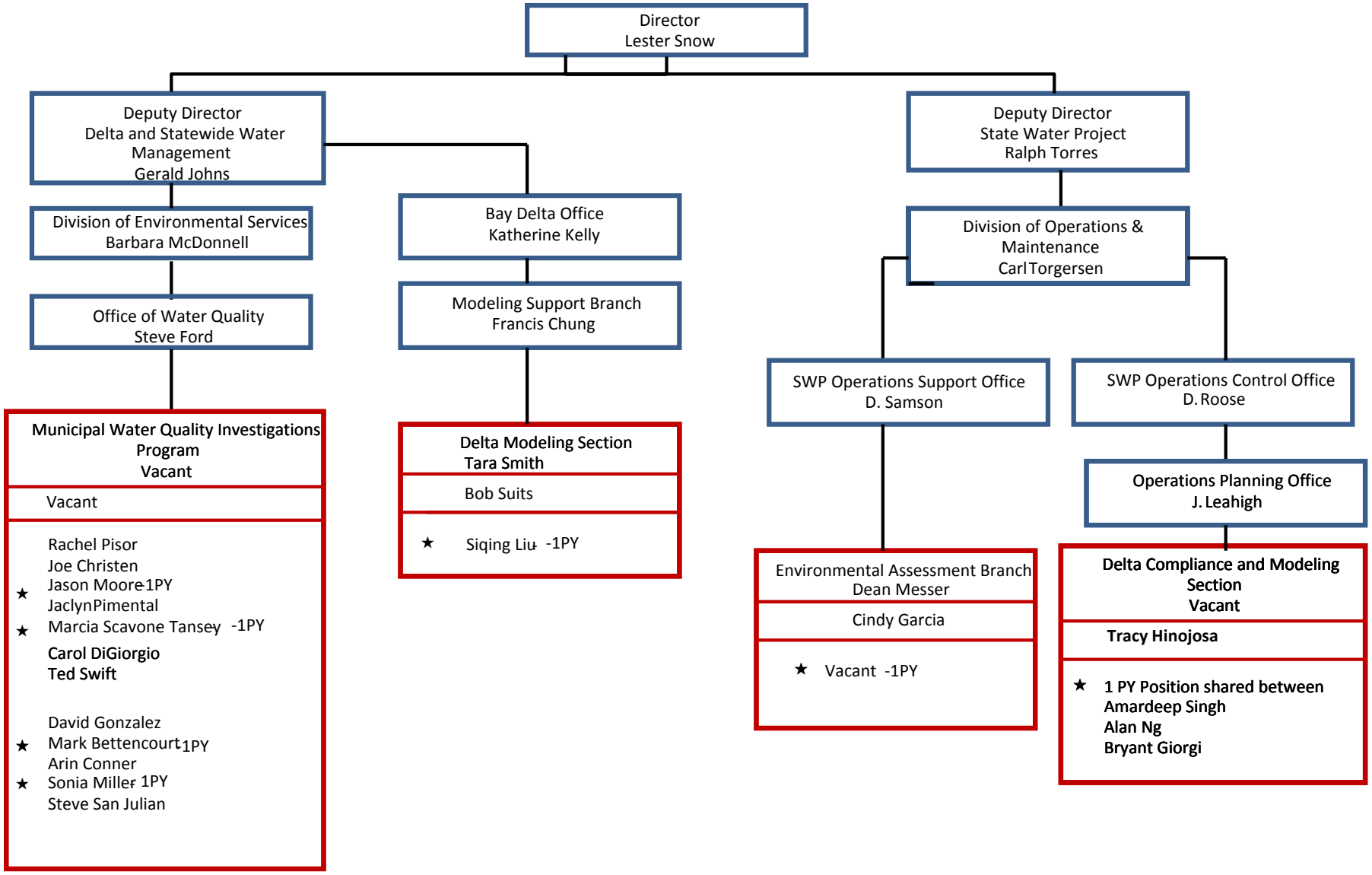
Journal Submissions

With the time and financial investment that has been dedicated to the MWQI program, it is important to create validated and referenced studies. The MWQI program will continue to use the DWR reports/publications process, but more emphasis will be put on publishing in scientific journals. This insures that the professional effort expended by the MWQI scientists is showcased in a peer-respected

venue. Additionally this elevates the individual staff in their own professional career. With the evolution of more scientific entities in the CALFED process, MWQI findings need to be presented on equal footing with other drinking water research project results.

13 ORGANIZATION CHART

MWQI Funded Positions in the Department of Water Resources



★ Indicates this was one of the seven new positions authorized in 2007/08 by MWQI SWP Contractors with positions filled in 2008/09.

14 GLOSSARY OF ACRONYMS AND TERMS

AMS Accelerated Mass Spectrometry

BCP Budget Change Proposal

BLM U.S. Bureau of Land Management

BMP Best Management Practices

Ca Calcium

CBDA California Bay Delta Authority

CCWD Contra Costa Water District

CDEC California Data Exchange Center

CDPH California Department of Public Health

CUWA California Urban Water Agencies

CVP Central Valley Project

DBP Disinfection by-product

DCC Dry Creek Conservancy

DDT Dichloro-Diphenyl-Trichloroethane (insecticide)

DFG California Department of Fish and Game

DMC Delta-Mendota Canal

DO Dissolved Oxygen

DOC Dissolved Organic Carbon

DOE DWR Division of Engineering

DPLA California Department of Water Resources, Division of Planning and Local Assistance

DSM2 Delta Simulation Model 2

DU Ducks Unlimited

DWR California Department of Water Resources

DWR EMC Department of Water Resources Emergency Management Comittee

EC Specific Electric Conductivity

EPA U.S. Environmental Protection Agency

FSR Feasibility Status Report, used in information technology planning

FY Fiscal Year

GC-MS Gas Chromatography Mass Spectrophotometer

GIS Geographic Information System

HAA Haloacetic Acid

HAAFP Haloacetic Acid Formation Potential

IC Ion Chromatography, Inorganic Carbon (e.g., dissolved carbon dioxide)

IEP Interagency Ecological Program

IT Information Technology

KHP Potassium hydrogen phthalate

LC-MS Liquid Chromatography Mass Spectrometry

LLNL Lawrence Livermore National Laboratory

MWDSC Metropolitan Water District of Southern California

MGD Million Gallons per Day

MWQI Municipal Water Quality Investigations

Na Sodium

NEMDC Natomas East Main Drainage Canal

NDBA N-nitroso-di-n-butylamine

NDMA N-nitroso-dimethylamine

NDPA N-nitroso-di-n-propylamine

NMEA N-nitroso-methylethylamine

NMOR N-nitrosomorpholine

NPYR N-nitroso-pyrrolidine

NMR Nuclear Magnetic Resonance (analysis)

O&M Department of Water Resources Division of Operations and Maintenance

OC Organic carbon

OCO Operation Controls Office (DWR O&M)

OEE Operating Expenses and Equipment

PCB polychlorinated byphenyls

QA/QC Quality Assurance, Quality Control

QC Quality Control

RTD Real time Data

RTDF Real time Data and Forecasting Program

RTDF-CP Real time Data and Forecasting – Comprehensive Program

SBA South Bay Aqueduct

SDIP South Delta Improvement Program

SLDMWA San Luis Delta Mendota Water Authority

SOP Standard Operating Procedure

SPC Specific Projects Committee

SUVA Specific ultraviolet absorbance

SWC State Water Contractors

SWP State Water Project

SWPCA State Water Project Contractors Authority

TBD To Be Determined

TDS Total Dissolved Solids

THM Trihalomethane

THMFP Trihalomethane formation potential

TKN Total Kjeldahl Nitrogen

TMDL Total Maximum Daily Load

TNC The Nature Conservancy

TOC Total (dissolved and suspended particulate) organic carbon

UCD University of California at Davis

UCSB University of California at Santa Barbara

UNO University of New Orleans

USBR U.S. Bureau of Reclamation

USGS United States Geological Survey

UVA *n* Ultraviolet absorbance at wavelength *n*

VAMP Vernalis Adaptive Management Program

WDL California Water Data Library

WWTP Waste Water Treatment Plants