Delta RMP Objectives

At the Delta RMP kick-off meeting in September, stakeholders recognized two major challenges to a better understanding of water quality in the Delta: 1) we are largely unable to address cross-cutting issues—such as, for example, the Pelagic Organism Decline (POD)— with the current way of monitoring and evaluating data, and 2) we are not set up to integrate data across different programs, which is a prerequisite for conducting the types of analysis that would allow for a more comprehensive view.

To be successful, the Delta RMP will need to address these problems head-on. This will be accomplished by proceeding in a phased approach that would begin with a pilot phase (Phase I). The purpose of the RMP pilot will be three-fold:

1. Build interest, involvement, and momentum by answering interesting and important questions that require a comprehensive, regional view
2. Develop capabilities for regularly compiling, synthesizing, and reporting data from existing, ongoing monitoring efforts, and
3. Use this effort as a proof of concept that sets the stage and creates capabilities needed for the longer-term regional monitoring.

Phase II will have the purpose of defining the long-term structure and goals of the Delta RMP. We expect that the long-term program will strive for integration across different programs based on results of pilot.

The proposed approach for developing monitoring objectives is two-fold: 1) agree on a set of specific *short-term question*s to answer in the pilot phase (first three years); and concurrently 2) develop an *objectives framework* for ensuring that the RMP will address the most important *long-term* information needs. The proposed long-term objectives framework is explained in the attachment; it consists of core questions that identify fundamental management concerns that can be expressed in broad, readily understood terms. These core management questions are then connected to specific assessments or study elements by more detailed tiers of questions that can serve as the basis of explicit monitoring designs and assessment designs. Prioritization criteria for selecting monitoring questions may be as follows:

Prioritization Criteria for selecting initial monitoring questions (short-term):

1. *Has the question already been answered, or is it being answered?* If the answer is "yes", then the question is rejected. In these cases, the RMP should work to communicate the existing answer and to improve communication among water quality managers and scientists.
2. *Can the question be translated into a specific monitoring or study design?* The question needs to have "practical value" for planning and designing monitoring studies or assessments.
3. *Is the question directly related to the priority management concerns of multiple stakeholder groups?* If the answer is "yes", and the question has passed the other criteria, then it is given a high priority.

4. *Can the question be answered using available resources[1]?* If the answer is "no", then the question is rejected. As the RMP grows, it will endeavor to add funds and partnerships that will increase its technical capabilities.
5. *Can the question be answered in three years?* If the answer is "no", or "probably not", then the question is rejected at this time. The Delta RMP should initially focus on important questions that can be answered quickly. There are many priority questions that cannot be answered without many years of monitoring or intensive research.
6. *Does the question provide opportunities for demonstrating the viability of regional monitoring concepts, building important institutional infrastructure, or developing needed monitoring tools (e.g., standardized methods)?*

Prioritization Criteria for selecting monitoring questions (long-term):

Prioritization criteria 1-4.

Here are some proposed short-term topics for an initial synthesis report:

(1) Pesticides (e.g., pyrethroids)
(2) Toxicity
(3) Dissolved oxygen
(4) Mercury and methylmercury
(5) Ammonium
(6) Dissolved organic carbon (DOC)
(7) Temperature
(8) Pharmaceuticals and personal care products
(9) Endocrine disruptors
(10) Disinfection byproducts (DBPs) and DBP precursor levels, including bromide levels in Delta waters
(11) Salinity
(12) Concentration of contaminants in sediment cores
(13) Sediment toxicity

[1] Available resources include those that can be freed up by removing inefficiencies in existing programs.

Attachment A:

Straw Objectives Framework for Delta Water Quality Monitoring

This attachment contains a proposed long-term objectives framework for the Delta RMP and relates it to the goals and objectives of existing water quality monitoring efforts in the Delta.

The proposed objectives framework consists of broader, core questions and the more detailed questions that convert these into specific monitoring designs. Core questions express general topics of interest:

1. Levels of concern and associated impacts
2. Sources, pathways, loadings, and processes
3. Trends
4. Status of water quality condition, including spatial patterns
5. Projected water quality conditions and impacts

The following table contains the proposed monitoring questions and relates them to existing water quality monitoring programs in the Delta. Existing water quality monitoring needs relating to the proposed core questions are gleaned from regional planning efforts in the Delta, such as the Delta Vision process or the State Water Resources Control Board's Delta Strategic Workplan. Existing monitoring goals and objectives relating to more specific monitoring questions under these core questions were compiled from continuing, long-term monitoring programs in the Delta.

List of Acronyms

CALFED	State-federal program with the mission to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta System.
CMP	Coordinated Monitoring Program
CVRWQCB	Central Valley Regional Water Quality Control Board
D-1485	State Water Rights Decision 1485
D-1641	State Water Rights Decision 1641
DBP	Disinfection Byproduct
DFG	Department of Fish and Game
DOC	Dissolved Organic Carbon
DPR	Department of Pesticide Registration
DWR	Department of Water Resources
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
ERP	Ecosystem Restoration Program
IEP	Interagency Ecological Program
ILRP	Irrigated Lands Regulatory Program
ISB	Independent Science Board
MWQI	Municipal Water Quality Investigations
NAWQA	National Water Quality Assessment Program
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
NWIS	National Water Information System
SCRSD	Sacramento County Regional Sanitation District

SDWA	Safe Drinking Water Act
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SRWP	Sacramento River Watershed Program
SWAMP	Surface Water Ambient Monitoring Program
SWP	State Water Project
SWRCB	State Water Resources Control Board
USBR	U.S. Bureau of Reclamation
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey

STRAW QUESTIONS ***Core Questions*** **Associated Monitoring Questions**	**Related Monitoring Program Goals and Objectives**
STRAW CORE QUESTION 1: *Are contaminants in the Delta potentially at levels of concern and are associated impacts likely?* Levels of concern and associated impacts	
Relates to: – ERP Conservation Strategy Goal 6. Water and Sediment Quality (ERP Conservation Strategy 2008) · Water Quality: known stressors that are a focus for ecosystem-based species recovery strategy: pesticides (e.g. pyrethroids), toxicity, DO, mercury and methylmercury, ammonium. Sediment Quality: concentration of contaminants in sediment cores, sediment toxicity – Emerging contaminants (ISB 2007): · Pharmaceuticals and personal care products. Residues of powerful drugs and personal care products – and their metabolites – that are apparently entering rivers with municipal or industrial wastewater · Endocrine disruptors. Compounds known to be endocrine disruptors that have been shown to affect reproductive outcomes and, in some cases to cause sex changes in test species such as fish · DBPs and DBP precursor levels. Some DBPs are members of chemical classes - such as brominated and iodinated acetic acids and acetonitriles, and nitrosoamines - known to have significant health effects on test species.	

Associated Monitoring Question 1-1. *What is the potential for impacts due to contamination?*	– Selenium Verification Study (DFG): a continuation of a state wide investigation of selenium in fish and wildlife which began in 1985 and conducted under interagency agreement with the SWRCB. Continuation of a USBR program investigating selenium in agroforestry habitats. Participates in a nationwide program conducted by EPA using newly developed protocols for stream assessment. – SWP Water Quality Monitoring (DWR): Compare SWP water quality to drinking water standards, Article 19 contractual requirements, or other criteria. – Municipal Water Quality Investigations (DWR): provide monitoring data to MWQI Program participants and other identified stakeholders, such as CALFED, on key constituents of concern – Irrigated Lands Regulatory Program (CVRWQCB): evaluate the presence of cumulative impacts from multiple stressors that may result in water or sediment toxicity – Raw Water Regulatory Compliance (City of Antioch); comply with regulations. Tested water is used as a raw water supply for a municipal water treatment plant. – Stockton Stormwater Monitoring (City of Stockton); evaluate water quality of discharges as it relates to baseline or benchmark conditions in receiving waters. – Delta Mendota Canal (City of Tracy): comply with standards for drinking water – SDWA (City of Vacaville and City of Fairfield): comply with the federal and State regulations as mandated by SDWA. Sampling takes place the first month of each quarter of the calendar year. The cities of Benicia, American Canyon, Fairfield, Napa, Vacaville, and Vallejo have established a user's agreement to share the data collected at Barker Slough. – City of Vallejo – Water Quality (City of Vallejo): perform Title 22 and source water monitoring and process control. – Source Water Monitoring (Contra Costa Water District): monitor source water for treated water supply – SRWP Monitoring Program (SRWP): identify the effects of constituents of concern that affect the overall heath of the Sacramento River watershed.

Associated Monitoring Question 1-2. *What are appropriate water quality guidelines?*	– Sacramento Coordinated Monitoring Program (SCRSD): CMP partnering agencies collect river water samples and tests for a variety of water quality constituents and contaminants. A fundamental purpose is to develop high-quality data to aid in the development of water quality policy and regulations in the Sacramento area.

STRAW CORE QUESTION 2: *What are the sources, pathways, loadings, and processes leading to water quality impacts in the Delta?*

Sources, pathways, loadings, and processes

Relates to:

Associated Monitoring Question 2-1. *Which sources, pathways, loadings, and processes contribute most to impacts?*	– Methylmercury cycling and export from agricultural and natural wetlands (USGS): monitor methylmercury in water, sediment, and invertebrates and monitor water chemistry and plant metrics in rice, fallow fields, and seasonal and permanent wetlands – Hot Spot Monitoring (DFG): multiple water quality monitoring activities; sinks (e.g., photo-demethylation) & fluxes (e.g., sediments) as function of environmental conditions – Groundwater Protection Program (DPR): determine how pesticides are contaminating ground water, identifies areas sensitive to pesticide contamination – Surface Water Protection Program (DPR): identify the sources of pesticide residues, determine the mechanisms of off-site movement of pesticides – Surface Water Ambient Monitoring Program (SWAMP) - San Joaquin Unit (CVRWQCB): help identify sources of potential impairment – Transport, cycling and fate of mercury and monomethyl mercury in the San Francisco Delta and tribs (SRWP): Conduct rate studies in Sacramento river during spring and fall to evaluate conservative transport of methyl mercury – SRWP Monitoring Program (SRWP): Develop a cost-efficient and well-coordinated long term monitoring program to assess conditions within the watershed. Identify the causes of constituents of concern that affect the overall heath of the watershed.

Associated Monitoring Question 2-2. *What are the effects of management actions on loads?*	– Irrigated Lands Regulatory Program (CVRWQCB): determine the magnitude of waste discharged to waters of the State through concentration, flow and load information – Subsurface Agricultural Drainage Monitoring Program (CVRWQCB): data is used to support the Salt and Boron and Selenium TMDL programs – SWAMP - San Joaquin Unit (CVRWQCB): data collected is also used to support the Salt & Boron and Selenium TMDL programs. – SRWP Monitoring Program (Sacramento River Watershed Program): measure progress as control strategies are implemented.

STRAW CORE QUESTION 3: *Are water quality conditions and associated impacts in the Delta getting better or worse?*

Trends – increased or decreased

Alternative question:

How are conditions of streams, rivers, and ground water in the Delta changing over time? (NAWQA - USGS)
How do natural features and human activities affect these conditions, and where are those effects most pronounced? (NAWQA – USGS)

Relates to:

Associated Monitoring Question 3-1. *What are the effects of management actions on water quality conditions?*	– D-1641 continuous recorder sites (USBR, DWR): compliance with Bay-Delta Standards contained in D-1641 – Continuous Monitoring in the Delta (USGS): continuously monitor suspended-solids concentrations, temperature, salinity, and water level at Delta sites – SWP Water Quality Monitoring (DWR): document spatial and temporal changes in SWP water quality – DWR Operations & Maintenance - Water Quality Section (DWR): record the physical and chemical composition of water in the Sacramento-San Joaquin Delta region to document impacts of the State Water Project in compliance with State Water Resources Control Board decision 1485 – IEP Environmental Monitoring Program (DWR): provide necessary information for compliance with flow-related water quality standards specified in the water right permits. – DWR San Joaquin District Surface Water Monitoring Sites (DWR): The DWR San Joaquin District samples water quality at several local stream and river locations in the San Joaquin basin and Delta. Water quality parameters analyzed include EC, various standard minerals and nutrients.

	– ILRP (CVRWQCB): 1. Assess the effects of irrigated agriculture on water quality and associated beneficial uses 2. Determine the effectiveness of management practices and strategies shown to reduce discharges of wastes that degrade water quality 3. Determine the magnitude of waste discharged to waters of the State through concentration, flow and load information. – NPDES Self Monitoring Program (CVRWQCB): Monitoring activities of waste dischargers required by NPDES permits – SWAMP - San Joaquin Unit (CVRWQCB): determine, over time, if implementation efforts are improving water quality. – Sacramento Coordinated Monitoring Program (SCRSD): Develop high-quality data to aid in the implementation of water quality policy and regulations in the Sacramento area.

STRAW CORE QUESTION 4: *What is the chemical and physical composition of Delta water?*

Status of water quality condition, including spatial patterns

Alternative question:

What is the condition of streams, rivers, and ground water in the Delta? (NAWQA - USGS)

Relates to:

- DOC as a key management issue (Delta Vision Process 2008)
- Salinity as a key parameter affecting designated uses (ISB 2007)

Associated Monitoring Question 4-1. *Are there particular regions of concern?*	– <u>NWIS (USGS):</u> 1. Surface-water data describe stream levels, streamflow (discharge), reservoir and lake levels, surface-water quality, and rainfall. The data are collected by automatic recorders and manual measurements at field installations. 2. Ground-water level data are collected and stored as either discrete field-water-level measurements or as continuous time-series data from automated recorders. 3. Water Quality: At selected surface-water and ground-water sites, the USGS maintains instruments that continuously record physical and chemical characteristics of the water including pH, specific conductance, temperature, dissolved oxygen, and percent dissolved-oxygen saturation. Supporting data such as air temperature and barometric pressure are also available at some sites. USGS also collects discrete sample data and analyzes chemical, physical, and biological properties of water, sediment and tissue samples. – <u>Methylmercury Assessments (DFG):</u> conducting additional methylmercury assessments in Yolo Bypass Wildlife Refuge wetlands

	– Groundwater Protection Program (DPR): determines where pesticides are contaminating ground water, identifies areas sensitive to pesticide contamination. – Surface Water Protection Program (DPR): characterize pesticide residues. – Surface Water Ambient Monitoring Program (SWAMP) - San Joaquin Unit (CVRWQCB): evaluate whether the most limiting beneficial uses in a specific water body are being protected – SRWP Monitoring Program (SRWP): identify the extent of constituents of concern that affect the overall heath of the Sacramento River watershed.
STRAW CORE QUESTION 5: *What are the projected water quality conditions and associated impacts in the Delta?* Projected water quality conditions and impacts	
Relates to:	
Associated Monitoring Question 5-1. *What is the water quality forecast under various management scenarios?*	– San Joaquin River Real-time Water Quality Management Program (USBR): simulate and forecast water quality conditions along the lower SJR

References

CALFED ISB. 20 April 2007. Letter to Phil Isenberg (Chair, Delta Vision Blue Ribbon Task Force). http://deltavision.ca.gov/BlueRibbonTaskForce/April2007/Handouts/Item_4_Handout_2.pdf.

DFG, NMFS, and USFWS. 8 January 2008. CALFED ERP Conservation Strategy: Stage 2 implementation in the Delta-Suisun Planning Area. Presentation to the CALFED Agency Coordination Team. http://www.delta.ca.gov/meetings/pdf/2008/012408_item_16.pdf.

Mount, Jeffrey, Twiss, Robert, and Richard A. Adams. 14 June 2006. The role of science in the Delta visioning process: a report of the Delta Science Panel of the CALFED Science Program. Public review final report. http://deltavision.ca.gov/docs/Status_and_Trends/Selected%20References/General/The%20Role%20of%20Science%20in%20the%20Delta%20Visioning%20Process.pdf.

SWRCB, CVRWQCB, and SFBRWQCB. June 2008. Strategic workplan for activities in the San Francisco Bay/Sacramento-San Joaquin Estuary. http://www.waterrights.ca.gov/baydelta/docs/strategic_plan/baydelta_workplan_final.pdf.