

# MEMO



**To:** SRWP Monitoring Committee

**Cc:** SRWP Board of Trustees

**Date:** October 23, 2013

**Subject:** Summary of Interviews with Stakeholders for a Regional Monitoring Program Supported by the Sacramento River Watershed Program

**Stephen McCord, Ph.D., P.E.**  
759 Bianco Court  
Davis, CA 95616  
(530) 220-3165  
sam@mccenv.com

**Holly Jorgensen**  
P.O. Box 9233  
Chico, CA 95927  
(530) 781-2220  
holly@sacriver.org

## Overview

Under contract to the Sacramento River Watershed Program (SRWP) in 2008-2009, Dr. McCord investigated the feasibility of developing and implementing a sustainable regional monitoring program (RMP) for the Sacramento River watershed. That investigation culminated in 2009 with a stakeholder workshop, and produced an Investigation Report and a two-page RMP Fact Sheet<sup>1</sup>. Stakeholders listed in the report included wastewater dischargers, stormwater managers, irrigated agriculture dischargers, habitat and water managers, regulators, and others. Since that time, efforts have progressed for developing RMPs for the San Joaquin Valley and the Sacramento – San Joaquin Delta and for coordinating with broader regional and statewide programs.

The next step identified for developing an RMP for the Sacramento River watershed was to interview key stakeholders representing all major perspectives. McCord Environmental, Inc., with support from SRWP's Executive Director Holly Jorgensen, has completed the following tasks towards that end:

- Developed an interview questionnaire and talking points to address issues consistently.
- Maintained and communicated to stakeholders through SRWP's Monitoring Committee listserv (over 370 addresses).
- Updated the Monitoring Committee web page with key documents, contact information, and a description of this current effort.
- Scheduled and conducted interviews with key stakeholders in-person or remotely.
- Updated the SRWP Board of meetings and provided review drafts of the questionnaire and this memo.
- Provided a draft of this memo to stakeholders for review.

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<sup>1</sup> The report and fact sheet are both available on the SRWP's Monitoring Committee web page at <http://www.sacriver.org/ourwork/monitoring-committee>.

This memo summarizes the results and synthesis of those interviews, recommends RMP functions, and suggests next steps in the pursuit of a functioning RMP. All interview responses are documented in **Appendix A**. The SRWP acknowledges the Sacramento Regional County Sanitation District and the California Department of Conservation for funding portions of this work.

## Interviewees

The SRWP is a critical player at the scale of the Sacramento River watershed, supporting and partnering with hundreds of large and small stakeholder entities (**Figure 1**). A representative subset of stakeholders was interviewed for this effort. All interviewees are shown in **Table 1**. We heartily thank each of these individuals for their time and interest in being interviewed and thank additional stakeholders for their comments and reviews.

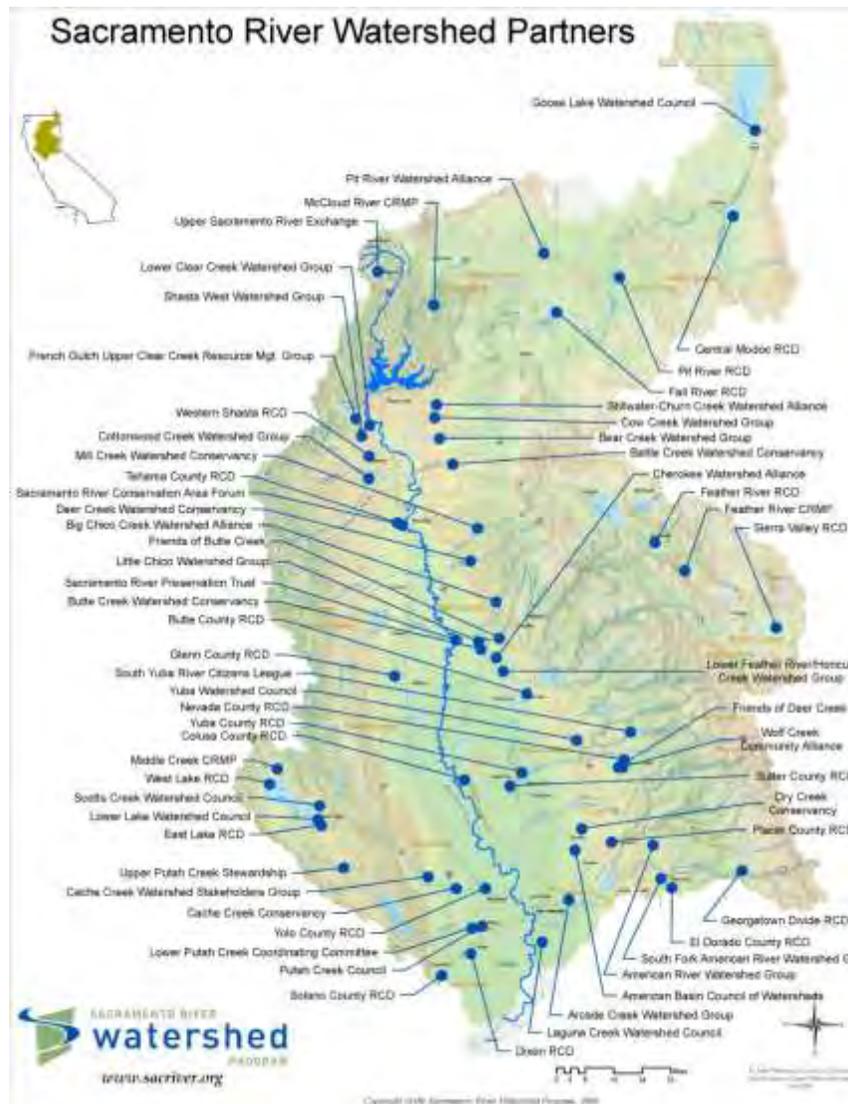


Figure 1. A map depicting partners of the Sacramento River Watershed Program, circa 2006.

**Table 1. Interviewees for the RMP investigation**

<b>Appendix</b>	<b>Interviewee</b>	<b>Stakeholder Category(ies)</b>	<b>Interview Date</b>
A1	Central Valley Regional Water Quality Control Board (Regional Board): Alisha Wenzel (SWAMP) and Meghan Sullivan (Delta RMP)	Regulators	1/29/13
A2	California Department of Water Resources (DWR) Northern District: Bev Anderson-Abbs and Scott McReynolds	Water Managers	1/30/13
A3	United States Environmental Protection Agency (USEPA): Debra Denton [in person] and Tim Vendlinski [review]	Regulators	2/1/2013
A4	United States Geological Survey (USGS): Joe Domagalski [Contaminants plus NAWQA], Michelle Hladik [Pesticide Fate Group], and Charlie Alpers [Mercury]	Scientists	2/15/13
A5	Sacramento Area Coordinated Monitoring Program: Vyomini Pandya, Jason Lofton, and Linda Dorn (Sacramento Regional County Sanitation District, or SRCSD), Brian Laurenson (Larry Walker Associates), Dave Tamayo (Sacramento County)	Stormwater Dischargers; Wastewater Dischargers	2/25/13
A6	Central Valley Clean Water Association (CVCWA): Debbie Webster (CVCWA Executive Officer) [in person] and Marcia Ames (City of Redding) [email]	Wastewater Dischargers	3/11/13
A7	Sacramento Valley Water Quality Coalition (SVWQC): Bruce Houdesheldt (Northern California Water Association, or NCWA) and Claus Suverkropp (Larry Walker Associates)	Irrigated Agriculture Dischargers	3/18/13
A8	United States Fish and Wildlife Service (USFWS): Cathy Johnson, Kevin Aceituno, and Tom Maurer	Scientists / Habitat and Fisheries Managers	3/21/13
A9	Water Contractors: Stephanie Fong, SFCWA DWR Central District: Karen Gehrts, Branch Chief for the Environmental Water Quality and Estuarine Studies Branch	Scientists / Water Managers	3/25/13
A10	The Nature Conservancy (TNC): Greg Golet	Scientists / Habitat Managers	5/14/13
A11	CA Dept. Fish & Wildlife: Mike Berry	Fisheries Managers	7/31/13
A12	United States Fish and Wildlife Service (USFWS): Jim Smith	Fisheries Managers	7/31/13

## Summary of Interview Responses

General comments highlighting key statements from interviewees are summarized in this section by stakeholder category.

### Interests by Stakeholder Category

As indicated in Table 1 above, categories of stakeholders interviewed included:

- Regulators
- Scientists

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- Wastewater Dischargers
  - Stormwater Dischargers
  - Irrigated Agriculture Dischargers
  - Water Managers
  - Habitat Managers
  - Fisheries Managers

Individual and general consensus comments are summarized here to provide a basis for the recommendations that follow.

### **Regulators**

The regulatory agencies that drive water quality-based programs are the Regional Board for state law (California Water Code) and USEPA for federal law (Clean Water Act). In general, the Regional Board enforces both laws while USEPA serves supporting and oversight roles. The Regional Board requires dischargers to monitor receiving waters through their respective permits. Most such permit-compliance data reported to the Regional Board are input into California Integrated Water Quality System (CIWQS), although data submitted as image files are not available online. Projects regulated or funded by either agency must use certified laboratories for analyses.

The Regional Board also monitors or directs monitoring through its regional SWAMP funding (largely contracted to DWR—see discussion below in section Water Managers). Statewide SWAMP activities that have occurred in the watershed include sport fish sampling in reservoirs (2007-2008) and rivers and streams (2011), sediment toxicity/chemistry sampling, and the Perennial Stream Assessment. Funding for SWAMP is relatively stable because it is funded by National Pollutant Discharge Elimination System (NPDES) permit fees and supplemented by USEPA funds.

All such funded monitoring data are input into the California Environmental Data Exchange Network (CEDEN). However, there is typically at least a one-year delay in public availability of data due to data validation and verification. USEPA supports its WQX database<sup>2</sup>, to which CEDEN links. The California Water Quality Monitoring Council is promoting its web portals to assess data and as tools to communicate with a broader audience. USEPA is promoting a similar web-based data visualization tool<sup>3</sup>. Ambient water quality monitoring data submitted to the Regional Board is incorporated into its 305(b) report, which includes its 303(d) list of impaired waters.

USEPA is interested in characterizing the links between critical species' habitat and life cycles co-occurrence and exposure/effects to stressor caused by land use changes. Towards that goal, USEPA staff serves on the Joint Board encompassing the San Francisco Estuary Institute – Aquatic Science Center<sup>4</sup> that are together advancing a range of research and monitoring efforts designed to lead to more coherent management of the Bay-Delta ecosystem. USEPA is also

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<sup>2</sup> On-line at <http://www.epa.gov/storet/>.

<sup>3</sup> Online at [http://www.epa.gov/storet/wtshd\\_summary.html](http://www.epa.gov/storet/wtshd_summary.html).

<sup>4</sup> On-line at <http://www.sfei.org/>.

supporting with funding the development of RMPs in the San Joaquin Valley and in the Sacramento – San Joaquin Delta.

USEPA grants typically aim to enhance ongoing efforts with syntheses providing broader views of the watershed. For example, simulation models can be applied to link pollutant sources to effects. Toxicity testing can be improved to check pollutant effects levels.

### **Scientists**

USGS is a unique federal agency in that it is strictly for scientific support. Major funding comes from the National Water-Quality Assessment Program (NAWQA), which sets funding levels and general priorities while allowing local office discretion for some program decisions. For essentially all monitoring that USGS conducts, it uses its own local or regional laboratories. USGS monitoring data is uploaded to its own NWIS database, not to the state's CEDEN or USEPA's XWQ database.

NAWQA's only current Sacramento watershed monitoring site is the Sacramento River at Freeport, where USGS continues long-term trends monitoring with 18-20 depth integrated samples/year. This site is also part of the National Stream Quality Network. Analyte classes include field measured parameters (i.e., pH, alkalinity, specific conductance, and alkalinity) nutrients, chloride, sulfate, organic carbon, and rice pesticides. Mercury is not monitored at Freeport.

USGS funding comes from its own national programs (e.g., NAWQA) and public agencies throughout California (e.g., DWR's study of the Cache Creek Settling Basin; State and Federal Contractors Water Agency funding of pesticides at Delta inputs). USGS hires "Observers" to sample total suspended solids for calibration of turbidity sensors and to report hazards or malfunctions. USGS could efficiently install nitrate, organic carbon (absorbance fluorescence), Chlorophyll *a*, and turbidity continuous sensors at their hundreds of existing stream gage stations, many with remote communication. USGS supports a watershed nutrient model SPARROW<sup>5</sup> that can be used to identify nutrient sources, pathways, and effects.

USFWS scientists based in Sacramento focus monitoring on their regulatory driver (i.e., Endangered Species Act), salmonid migration, and their wildlife refuges. Thus, they most commonly monitor pesticides, mercury and selenium for focused studies on their wildlife refuges. One particular interest is having more (or better access to) continuous sensors. When monitoring, USFWS typically uses the state's Department of Fish and Wildlife laboratory for analytical work. All monitoring is study-based and USFWS has no central database of its own.

### **Wastewater Dischargers**

All municipal wastewater dischargers to surface waters in the Sacramento River watershed are subject to NPDES waste discharge permits. Each permittee is required to monitor their effluent and receiving waters to ensure compliance with their permit conditions. Monitored constituents, locations, frequencies, and analytical detection levels depend on discharge flow rates and pollutant concerns in their effluent or in their receiving waters.

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<sup>5</sup> On-line at <http://water.usgs.gov/nawqa/sparrow/>.

Interview information includes an interview with the Sacramento Regional County Sanitation District (a single utility and the state's largest inland wastewater discharger), an interview with the Executive Officer of the Central Valley Clean Water Association (which represents most wastewater utilities in the Central Valley) and an email from Marcia Ames of the City of Redding. Funding for individual monitoring is through relatively stable rate-payer fees. NPDES permit fees already include a surcharge for SWAMP, so dischargers are already paying for watershed monitoring.

This category of stakeholder monitors specifically to comply with their individual NPDES permits. Receiving water monitoring stations are located upstream and downstream of individual outfalls. Multiple stations may be located downstream to evaluate mixing zones. Monitored conditions and constituents are generally infrequently broad (all regulated conditions and pollutants) but frequently focused (the subset of conditions and pollutants for which the discharger has permitted limits). Monitoring frequencies vary from weekly for conventional pollutants to once per permit term for the full suite of regulated pollutants. The latter set is often required in permits as a "receiving water characterization study." Special studies have also been mandated by the Regional Board for methylmercury, beneficial use designations, and site-specific objectives.

All monitoring data by these public utilities must be submitted to the Regional Board. Such data (both for effluents and receiving waters) are entered into CIWQS. Although CIWQS is publicly accessible, the system is rarely publicized and cumbersome to use (both for entering and accessing data). The SWAMP is currently working to link CIWQS data to CEDEN.

Beyond permit-compliance monitoring, other monitoring interests tend to be activities that reduce undue focus on minor contributions from or perceived effects of wastewater. Nutrients and pathogens are commonly cited as watershed concerns, yet remain largely unregulated outside of wastewater utility discharges. In a similar vein, an RMP may be able to support general permit flexibility by adjusting monitoring requirements to focus on regional interests.

### **Stormwater Dischargers**

The only stormwater management utility currently monitoring in the watershed is the Sacramento County Partnership, which is regulated under a Phase I NPDES permit. Ambient (receiving water) monitoring is conducted under the Sacramento Area Coordinated Monitoring Program through a cost-share agreement with SRCSD. Funding is relatively stable, although permit requirements vary each permit cycle. The Sacramento River reach overlaps both the Sacramento River watershed's and the Delta's RMP areas of interest. The Partnership has no interest in paying into an RMP if it is simply over and above permit compliance monitoring. Partnership data are submitted to the Regional Board in SWAMP-comparable format, but currently are not uploaded to CEDEN. Monitoring reports are provided to the Regional Board, but are not widely distributed. Continuous monitoring and simulation modeling by others (in an RMP context) would be useful to the Partnership for addressing regional issues.

No Phase II municipality was interviewed because none have been monitoring ambient water quality. The recently revised Phase II NPDES general permit<sup>6</sup> requires permittees that discharge

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<sup>6</sup> On-line at [http://www.waterboards.ca.gov/water\\_issues/programs/stormwater/phase\\_ii\\_municipal.shtml](http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml).

to waterbodies listed as impaired on the 303(d) list and where urban runoff is listed as a source to consult with their Regional Board to determine if monitoring is necessary. Otherwise, permittees with a population greater than 50,000 must either implement a regular receiving water monitoring program or conduct a special study monitoring program to assess and evaluate the effectiveness of water quality projects or storm water program elements. The permit also states “Permittees are encouraged to participate in a regional monitoring program in order to cost-effectively combine resources and water quality information.”

### **Irrigated Agriculture Dischargers**

The Northern California Water Association (NCWA) manages the Sacramento Valley Water Quality Coalition. The Coalition is composed of more than 8,600 farmers and wetlands managers under 12 subwatershed groups encompassing more than 1.2 million irrigated acres and supported by local farm bureaus, resource conservation districts, County Agricultural Commissioners, and the University of California Cooperative Extension. Landowners pay on a per irrigated acre basis to their subwatershed groups. The Coalition implements its Regional Plan for Action to meet the Regional Board's Irrigated Lands Regulatory Program (ILRP) through its Monitoring and Reporting Program Plan. The plan operates on a three-year cycle with two years of core monitoring and one year of more extensive assessment/baseline monitoring. DWR's and USGS' continuous sensors (flow rate and some water quality measurements) are also used.

The California Rice Commission manages a rice pesticides monitoring program specifically for rice growers to comply with the same ILRP. The Coalition coordinates with the California Rice Commission at sites in Sutter and Yolo Counties. Both programs:

- Submit their datasets to the Regional Board in SWAMP-comparable formats
- Provide regular (at least annual) assessments and reports
- Monitor only constituents of interest to agriculture
- Monitor only discharges from agricultural lands (not receiving waters)
- Participate in CV-SALTS to address nitrates and salinity<sup>7</sup>

California Rice Commission staff declined an interview. Reasons cited<sup>8</sup> include:

- Their monitoring program's specific focus on rice pesticides in rice field drains would not benefit from coordination with other monitoring interests.
- Staff and funds available are not intended for participating in larger stakeholder meetings.
- The Commission is concerned that regulators would use their focused monitoring program as a means to address questions of interest by adding new requirements.
- The Commission is preparing a Report of Waste Discharge and expects to receive a draft Waste Discharge Requirements “permit” later this year. Because ambient monitoring is not currently required, the Commission is concerned that participation in an RMP will be perceived as willingness to take on additional monitoring responsibilities.

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<sup>7</sup> The Coalition also participates in the Central Valley Drinking Water Policy Workgroup.

<sup>8</sup> Tele. comm. Tim Johnson to S. McCord, 2/14/13.

## Water Managers

DWR monitors in compliance with Water Right Decision 1641. Staff members in DWR's Northern District office manage their own monitoring program, sampling quarterly at 44 stations north of Verona. Several sites are along the mainstem Sacramento River, but more are near the mouths of major tributaries. Several sites are above Shasta Dam: Sacramento River, McLeod River, and Pit River (as far as Alturas and Fall River). All of these locations have 15-minute temperature data since late 2008 (some much earlier) and seasonal field measurements and analytical data.

Temperature and salinity are monitored most comprehensively because they are critical drinking water interests for the State Water Project. Federal Energy Regulatory Commission relicensing-related monitoring includes temperature (for effects on anadromous fisheries) and fish tissue (for reservoir effects on bioaccumulation). They also monitor surface flows for flood protection and groundwater levels for surface water interactions.

The SWAMP Sacramento Watershed Trends Monitoring funds labor and travel costs, while general funds cover DWR's in situ continuous sensors and Bright lab analyzes for almost all constituents. With additional funding DWR could provide staff expertise, lab analyses, and data analyses to other monitoring programs.

Although DWR is a state agency participating in the CWQMC, it still maintains all data in its own Water Data Library<sup>9</sup>. Data collected for SWAMP are submitted to the regional SWAMP coordinator, who then uploads the data into CEDEN. A fundamental shortcoming of the current monitoring effort is that the data are not assessed or synthesized except as used in bi-annual 305(b) reports.

In the Delta, DWR administers the Interagency Ecological Program's (IEP's) Environmental Monitoring Program (available via CDEC at <http://cdec.water.ca.gov/>) and the regional SWAMP (available via CEDEN). Funding for IEP monitoring is very stable via state and federal water contractors. SFCWA commissions special studies rather than baseline monitoring.

## Habitat Managers

Habitat managers such as TNC often focus monitoring on horticulture restoration (e.g., tracking plant success and health for its habitat value) and species of interest (e.g., bird diversity and numbers) in those habitats. These monitoring efforts are typically limited in time to the first few years post-restoration based on funding, restoration goals or California Environmental Quality Act (CEQA) mitigation conditions. TNC already coordinates its efforts and integrates its information with other organizations such as USFWS, the Migratory Bird Partnership (TNC, Point Reyes Bird Observatory, and Audubon Society), the Bank Swallow Technical Advisory Committee, the Central Valley Joint Venture Working Group, and UC Santa Cruz. TNC funds some monitoring internally from agricultural income on some of its restoration sites in the Sacramento Valley. Such data are archived at TNC and sometimes reported, but they are not generally uploaded to any central database.

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<sup>9</sup> On-line at <http://www.water.ca.gov/waterdatalibrary/>.

The Ecosystem Restoration Program funded the Sacramento River Monitoring and Assessment Project which synthesized available information to track implementation of restoration projects via an “indicators framework.” The framework focused on 36 quantitative ecological indicators (e.g., flow regime, terrestrial resources, and aquatic habitat) for conservation targets, ranked through thresholds comparisons. TNC led the production of “An Ecological Scorecard for Sacramento River Terrestrial Flora, Fauna and Channel Dynamics” report while Fraser Shilling led the production of a Monitoring Plan (actually more like guidance report). The Scorecard reports on the status of terrestrial resources and floodplain characteristics and evaluates progress towards the year 2000 CALFED ERP goals specific to the Sacramento River.

Monitoring to update the Scorecard would be useful for restoration planning in the valley. Water quality data collected and reported by others would be a great compliment if it links landscape restoration to aquatic resources (e.g., fisheries, aquatic food webs, and floodplain dynamics).

### **Fisheries Managers**

Fisheries managers are connected with water managers through hatcheries. The hatcheries are intended to mitigate for the loss of access to spawning habitat upstream of dams. Major concerns include unscreened diversions, polluted runoff from marijuana cultivation, and stranding by upstream reservoir storage.

Fisheries managers interviewed primarily monitor salmonid migrations for the four major runs (spring, winter, fall and late fall) two of which are protected under the Endangered Species Act throughout the Sacramento River Watershed. They rely on others for flow and water quality monitoring. Coordination occurs between the state (CDFW) and federal (USFWS and National Marine Fisheries Service) fisheries managers and with state (DWR) and federal (USBR) water managers. They also have several work teams and task forces, and work with the Golden State Salmon Association and other groups concerned with the status of salmonids.

While the monitoring conducted primarily by DWR is useful and data are available on-line, fisheries managers desire a program that analyzes and reports on those data. Monitoring is much less intensive in tributaries than in the mainstem, and less intensive downstream of Red Bluff than upstream. Also, older data remain only in printed form, limiting the ability to assess long-term trends.

## **Discussion and Synthesis**

This section draws on past experiences in the watershed, the stakeholder interviews, other discussions with local stakeholders, and experience with other RMPs throughout the state.

### **Coordination Leaders**

A key issue is what existing entities can support the coordination of RMP stakeholders. Entities that already coordinate with some of the same stakeholders include:

- Statewide and Regional SWAMP for ambient monitoring by Regional Board staff and others ([http://www.waterboards.ca.gov/water\\_issues/programs/swamp/](http://www.waterboards.ca.gov/water_issues/programs/swamp/)); all data are submitted to CEDEN regional databases (<http://ceden.org/>)

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- Water Quality Coalitions for irrigated agricultural dischargers (<http://www.svwqc.org/> and <http://www.calrice.org/Environment/Water+Quality/Water+Quality.htm>)
  - CVCWA for wastewater treatment utilities (<http://www.cvcwa.org/>); all data are submitted to CIWQS ([www.waterboards.ca.gov/ciwqs](http://www.waterboards.ca.gov/ciwqs) )
  - CASQA for stormwater management utilities (<http://www.casqa.org/>)
  - Upper Sacramento River Monitoring Project Work Team for program coordination
  - Central Valley Drinking Water Policy Workgroup for valley-wide policy development
  - CV-SALTS for regional salt and nutrient management planning (<http://cvsalinity.org/>)<sup>10</sup>
  - California Water Quality Monitoring Council for monitoring agency coordination ([www.waterboards.ca.gov/mywaterquality/monitoring\\_council](http://www.waterboards.ca.gov/mywaterquality/monitoring_council) )
  - The Delta Regional Monitoring Program ([www.waterboards.ca.gov/rwqcb5/water\\_issues/delta\\_water\\_quality/comprehensive\\_monitoring\\_program/](http://www.waterboards.ca.gov/rwqcb5/water_issues/delta_water_quality/comprehensive_monitoring_program/))<sup>11</sup>
  - Integrated Regional Water Management groups for regional water planning

Although this list of coordination leaders is extensive, none of them clearly fits the niche of a regional water quality monitoring program as they focus on other geographic areas, a subset of stakeholders, or a subset of indicators.

## Indicators of Interest

Several conditions and constituents appear to be of broad interest to stakeholders, including:

- Pathogens for drinking water and water recreational interests
- General condition (e.g., salinity for drinking water and agricultural interests, temperature for anadromous fisheries, turbidity, pH)
- Metals (e.g., arsenic, aluminum) for toxic effects
- Mercury in fish tissue for bioaccumulative effects
- Nutrients (e.g., nitrogen and phosphorus species) for effects on eutrophication and drinking water disinfection byproducts
- Pesticides of current use for toxic effects in water and sediments
- Toxicity assessments (both biological indicators and toxicity tests) for general indicators that integrate water quality conditions

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<sup>10</sup> For the current Basin Plan Amendment process evaluating Municipal and Domestic Supply (MUN) beneficial use in Ag Dominated Water Bodies, the Central Valley Water Board is doing the monitoring with the assistance of CV-SALTS funding. However, the MUN de-designation process will be evaluating the exceptions in the State Resolution 88-63 (Sources of Drinking Water Policy), and exception 2b for water bodies conveying or holding agricultural drainage waters requires monitoring to “assure compliance with all relevant water quality objectives as required by the Regional Boards.” This ongoing monitoring requirement needs to be added to the Basin Plans, but stakeholders do not yet know what this will look like (i.e., constituents, locations, frequency) or who will fund it. It may be that the existing ILRP and NPDES programs can be used for this implementation piece.

<sup>11</sup> The Delta RMP is also under development. At this time a Steering Committee has been formed and Technical Advisory Committee Co-Chairs appointed. Monitoring stations in the lower Sacramento River would overlap the watershed’s area of interest.

Prioritizing this list may be useful for streamlining existing activities or advancing a special study. Otherwise, coordination can simply be organized by constituent set without excluding any.

An alternative approach is to look more holistically at watershed health. To this end, the California Water Quality Monitoring Council's Healthy Streams Partnership<sup>12</sup> is working with USEPA's Healthy Watersheds Initiative<sup>13</sup> to develop the first ever multimetric systems-based assessment of the health and vulnerability of California's watersheds. Once complete, this map-based assessment information will be added to the California Healthy Streams Portal<sup>14</sup>. This portal currently provides data and assessment information about the extent and condition of California's streams and rivers, including an interactive home-page graphic to educate the public about numerous factors that affect stream health. Coordinating with the Healthy Watersheds Initiative effort through shared partners at UC Davis, DWR is developing a related set of sustainability indicators that will be critical to implementing the integrated water management goals of the 2013 Update of the California Water Plan. This assessment would be a useful compliment or companion to the Council's California Wetlands Portal<sup>15</sup> and the Ecological Scorecard recommended by TNC.

## Funding Needs and Options

Funding needed to support an effective RMP depends on the level of effort. Three levels of effort are described below. Furthermore, the costs to any particular participant would depend on the number of participants, the program's relevance to their needs and interests, and their current costs. **Table 2** portrays how an RMP's costs would change monitoring activities for a typical participant.

**Table 2. Generic changes in monitoring activities for an individual entity participating in an RMP.**

Program	Monitoring Type		
	<i>Routine</i>	<i>Special Studies</i>	<i>Advancing Knowledge</i>
Independent Monitoring Activities	Multiple stations, constituents, and events	Individually designed and implemented	Site-specific assessments; internal reports
Regional Monitoring Program	Reduced redundancy, prioritized constituents, relevant events	Collectively designed and implemented	Holistic assessments; regional reports

<sup>12</sup> On-line at [http://www.mywaterquality.ca.gov/monitoring\\_council/healthy\\_streams/](http://www.mywaterquality.ca.gov/monitoring_council/healthy_streams/).

<sup>13</sup> On-line at <http://water.epa.gov/polwaste/nps/watershed/>.

<sup>14</sup> On-line at [http://www.mywaterquality.ca.gov/eco\\_health/streams/](http://www.mywaterquality.ca.gov/eco_health/streams/).

<sup>15</sup> On-line at <http://www.californiawetlands.net/tracker/>.

Potential sources of funding to consider for re-initiating an RMP are listed here, in order of more to less sustainable:

- **Stakeholders**—Members of the Monitoring Committee could be solicited for funds based on category and relative size within those categories. Stakeholders could form a separate Joint Powers Authority to direct fees towards an RMP, or simply commit funds to the SRWP for an RMP.
- **Integrated Regional Water Management (IRWM)**—DWR’s IRWM program has funded the development of IRWM Plans for eight regions in the watershed<sup>16</sup>. Various large-scale projects could be monitored pre- and post-implementation as an RMP component.
- **SWAMP**—The state funds multi-year assessments both regionally and statewide (including the Sacramento River watershed). The regional SWAMP funded DWR for four years as a stop-gap measure to continuing trends monitoring at 44 sites in the watershed. When the current contract expires in 2014, the regional SWAMP manager should consider allocating some portion of the funds to an RMP that takes into consideration and supports stakeholders.
- **Downstream stakeholders**—Monitoring could be funded wholly or in part by interests downstream in the Bay-Delta.
- **Grant programs**—Occasional grants, such as are currently being awarded by USEPA to RMP development efforts in the San Joaquin Valley and the Sacramento – San Joaquin Delta, could be awarded to the SRWP. The state’s Division of Financial Assistance is a useful clearinghouse for other statewide grants.

External grants have been critical in the past, but reliance on episodic grants and support is a short-term solution. In the future, grant funds should be considered supplemental rather than foundational. Sustainable, baseline funding for an RMP must come eventually from its beneficiaries through long-term commitments. Funding by beneficiaries could be in either or both of two forms: fees and in-kind services. Fees can be kept minimal by funding only the more critical, value-added activities that those currently monitoring need. In contrast to RMPs in southern California and the San Francisco Bay, a Sacramento River watershed’s RMP would not need to supplant monitoring currently conducted by those in the watershed.

## Recommendations

The recommendations provided in this section respond to key management questions:

- What would an effective RMP in the watershed be tasked to do?
- What role should the SRWP play in developing and implementing that RMP?
- What are the next steps to starting that RMP?

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<sup>16</sup> See [http://www.water.ca.gov/irwm/grants/docs/FundingAreaContacts/SacRiverFA2012\\_1016.pdf](http://www.water.ca.gov/irwm/grants/docs/FundingAreaContacts/SacRiverFA2012_1016.pdf).

## RMP Tasks

Given the many disparate entities currently (or occasionally) monitoring, their varied levels and certainties of funding, their myriad monitoring objectives, and the great distances separating them, a comprehensive, collective monitoring program appears neither practical nor desirable at this time. Therefore, first we recommend that the Monitoring Committee not:

- Serve as a governing or voting body
- Assume responsibilities for existing regulatory-driven monitoring
- Develop or support a watershed-specific monitoring database

Potential tasks for an RMP are organized into three levels of increasing effort, responsibility, and cost.

### Level 1 RMP Tasks - Coordination

The first level of RMP tasks that would seem to benefit the vast majority of stakeholders are essentially communication and coordination roles. A significant service provided by the SRWP's watershed monitoring efforts during the late 1990s and early 2000s was coordination.

Monitoring Committee meetings were regular opportunities for stakeholders to share updates on their monitoring projects; learn about improved monitoring, measuring and analytical methods; collectively review and comment on draft monitoring plans and reports. These functions could be renewed and supported at minimal cost. Specific tasks could include:

- Communicate with regional monitoring stakeholders through timely updates to the SRWP Monitoring Committee web page and periodic messages via the web-based listserv.
- Host approximately quarterly Monitoring Committee meetings in relatively central locations, open to anyone and accessible online.
- Present updates at SRWP's annual stakeholder meeting and annual watershed forum.
- Serve as a clearinghouse for linking monitoring funding needs with funding opportunities; support funding proposals by soliciting technical reviews and letters of support.
- Encourage and support monitoring entities to contribute relevant information to the Central Valley Monitoring Directory<sup>17</sup> and to the CEDEN regional data center.
- Coordinate with other regional initiatives: CV-SALTS, Central Valley Drinking Water Policy Workgroup.
- Share updates on monitoring stations (e.g., status, monitored conditions and constituents) in committee meetings (and in the Central Valley Monitoring Directory).
- Provide or support<sup>18</sup> tours on watershed themes to interested guests.

A good example of improving coverage and communication while reducing redundancies is the Klamath Basin Monitoring Program<sup>19</sup>. The Program, hosted at Humboldt State University, is comprised of state and federal agencies, tribal entities, PacifiCorp, and watershed groups

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<sup>17</sup> [http://www.waterboards.ca.gov/mywaterquality/monitoring\\_council/meetings/2011nov/cvmd\\_brochure.pdf](http://www.waterboards.ca.gov/mywaterquality/monitoring_council/meetings/2011nov/cvmd_brochure.pdf).

<sup>18</sup> For example, those led by the Water Education Foundation or River Partners.

<sup>19</sup> Available at <http://kbmp.net/>.

working together to understand and improve water quality conditions in the Klamath Basin. Members host two meetings annually aimed at addressing water quality concerns basin wide. Membership to the KBMP is voluntary, as are the KBMP subcommittees. Subcommittees include, Communication, Strategic Plan and Funding, Monitoring Plan, Blue-Green Algae, and the Digital Library and Database.

### **Level 2 RMP Tasks - Technical Support**

The second level of useful RMP tasks would be coordinating or providing technical support. There are entities on both sides of the support ledger: federal agency staff members are generally available for providing technical assistance, and many other stakeholders are interested in receiving technical support. Technical support tasks could include:

- Facilitate technical training for BMP selection, design, and implementation.
- Identify monitoring priorities and conduct a monitoring gap analysis.
- Develop a coordinated monitoring plan that integrates all ongoing monitoring programs.
- Facilitate technical training for monitoring program designers, field crews, analytical labs, and program managers.
- Support in producing and uploading SWAMP-comparable data into CEDEN.
- Compile, report, assess and synthesize monitoring data in a “Pulse of the Watershed”-type report or another “report card”-type assessment<sup>20</sup>.
- Compile available monitoring data to update “An Ecological Scorecard for Sacramento River Terrestrial Flora, Fauna and Channel Dynamics” report.
- Provide input for and review the bi-annual 305(b) report for water bodies in the watershed.
- Support special studies conducted by others by providing access to regional experts and implementers, reviewing or participating in the development of study designs and implementation.

### **Level 3 RMP Tasks - Monitoring and Special Studies**

The third level of RMP tasks would be conducting monitoring and special studies. The foundational element would be baseline monitoring in the mainstem and mouths of major tributaries. In addition, periodic special studies could be:

- Synoptic toxicity testing of water and sediments
- Synoptic biological indicator monitoring for regional benchmarking
- Evaluating other stressors to aquatic organisms (e.g., diversions, fish and wildlife management, invasive species, habitat alteration or loss)
- Evaluating potential climate change effects
- Simulation modeling of the sources, transport, and transformations of a condition or constituent of concern (e.g., SPARROW, WARMF, WEAP)
- Integrated watershed assessment applying sustainability indicators
- Contaminant source tracking

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<sup>20</sup> Two recent SRWP products of this type were for the Feather River ([www.sacriver.org/aboutwatershed/reportcard](http://www.sacriver.org/aboutwatershed/reportcard)) and one for the lower Sacramento River (not published).

- Project-scale effectiveness monitoring (pre- and post-implementation)

An appropriate approach for phasing in components of the RMP would be to identify and prioritize special studies based on an assessment and synthesis of available monitoring data (a Level 2 RMP task).

## SRWP Role

The geographic area that the RMP should encompass is the entire Sacramento River watershed even if effort may be focused on the mainstem Sacramento River or nearer to the mouths of major tributaries. Where the RMP intersects with other monitoring programs (Klamath Basin to the north; Delta to the south; IRWM Regions and the Sacramento Area CMP within), program managers should communicate periodically.

The SRWP should take the role of RMP lead. This recommendation is based on the SRWP's current standing, in which it already has:

- A broad, representative Board of Trustees
- Nonprofit status
- A mission consistent with the needs and interests of RMP stakeholders
- A history of successful regional monitoring and general stakeholder coordination
- A Monitoring Committee web page and listserv, including a broad set of representative stakeholders

Based on this recommended role, **Figure 2** presents a recommended organizational structure for an RMP led by the SRWP. The program could be initiated by appointing an RMP Manager, which would be needed for any level of program tasks. The current Monitoring Committee would become the Technical Advisory Committee. A Steering Committee should be formed before stakeholders are asked to contribute funds to sustain a program. An RMP Monitoring Team and/or *Ad Hoc* Workgroups would be needed to enact many Level 2 tasks and most Level 3 tasks.

A reasonable starting point for a draft RMP mission statement, consistent with the SRWP's mission, could be:

*The Regional Monitoring Program's mission is to inform decisions on how to protect or restore beneficial uses of water in the Sacramento River Watershed, by producing objective and cost-effective scientific information critical to understanding regional water quality conditions and trends.*

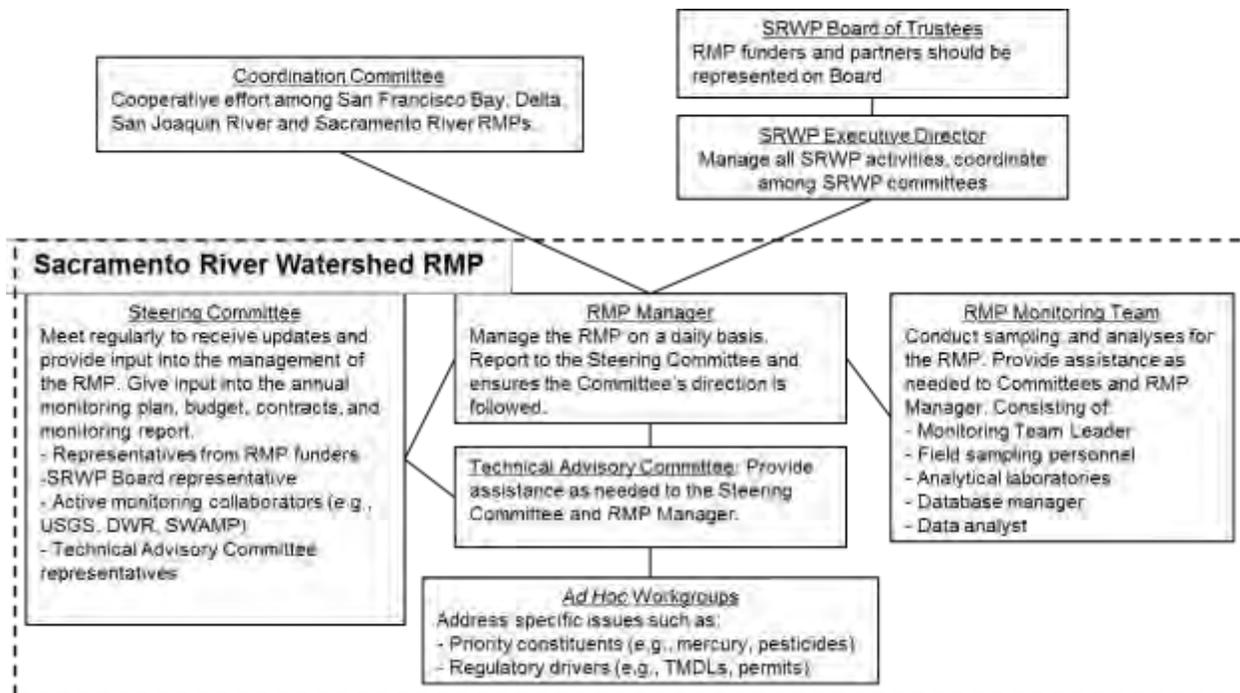


Figure 2. Recommended RMP organizational structure for the SRWP.

## Next Steps

The Level 1 RMP tasks require minimal effort. SRWP should almost immediately begin implementing those tasks. To that end, SRWP should:

- Maintain the Monitoring Committee web page and listserv.
- Contract an RMP Manager to communicate with stakeholders, organize quarterly Monitoring Committee meetings, and represent the RMP in other forums.
- Approach the potential sources of funding listed above (see Funding Options above).

**APPENDIX A**  
Sacramento River Watershed  
Regional Monitoring Program  
Interview Questions and Responses

**RMP Interview Questions – Meghan Sullivan and Alisha Wenzel (Regional Water Quality Control Board) by Holly Jorgenson and Dennis Heiman (SRWP), Stephen McCord (MEI); 29 January 2013**

**Your Monitoring**

***What are your current monitoring activities?***

Here are monitoring programs that the Regional Board either requires (via regulatory programs) or funds (via grants and other support):

- NPDES permittees self-monitor discharges and some receiving water near their outfalls. Permits aren't always clear on where receiving water stations are located but many are very specific stations upstream and/or downstream of their outfall.
- SWAMP Safe to Swim: Students and Citizens sample for E. coli
- SWAMP Trends monitoring: DWR samples 44 sites and analyzes for a broad spectrum of pollutants
- SWAMP Trends monitoring: SWAMP staff samples 3 sites in the Sacramento River watershed, analyze TOC/DOC at CDFW's lab and E. coli [elsewhere]
- Statewide SWAMP: SFEI sampled sport fish in reservoirs (2007-2008) and rivers and streams (2011)
- Statewide SWAMP sediment toxicity/chemistry sampling (SPoT): 14 sites in watershed among 100 sites statewide.
- Statewide bioassessment (Perennial Stream Assessment) w/reference sites: CDFW monitors bugs, algae, and nutrients. Sites are selected probabilistically by ecoregion, so there's no way to say how many per watershed. More info at [www.waterboards.ca.gov/water\\_issues/programs/swamp/reports.shtml#bmp\\_assess](http://www.waterboards.ca.gov/water_issues/programs/swamp/reports.shtml#bmp_assess)
- NPDES Phase II MS4 permit may have monitoring requirements, especially if discharge to waters with TMDLs.

***Why are you monitoring (what regulations and authorities require it)?***

N/A

***What aspects of your monitoring would you like to see changed or improved (and how)?***

- State Board is working on standardizing data formats and quality assurance requirements for surface water monitoring data.
- Discharger/receiving water data are submitted to CIWQS, which is not currently linked to CEDEN, but solutions are being considered. Not all data are available online – some still submit via pdf's.
- There is typically at least a 1 year delay in public availability of data due to data validation and verification. Same issue w/ILRP data (even under SWAMP w/CEDEN).
- Integrated reports use most data submitted, which means it includes a wide range of data qualities. Need to 'sell' the SWAMP help desk. Need more \$ for help desk.

***Where are your data stored and how are those data made available to others?***

- Any state grant-funded or SWAMP-funded ambient monitoring project is required to report data to CEDEN.
- ILRP Coalitions are required to report their monitoring data to CEDEN

- NPDES wastewater discharge permittees upload data into the California Integrated Water Quality System Project (CIWQS) database.
- DWR data are in DWR's own Water Data Library (DWR collects E. coli samples to be analyzed at Central Valley Water Board labs—this and field data are in CEDEN).
- CEDEN's required data elements are less cumbersome than the SWAMP database..

***Do you coordinate your monitoring with others (and if so, how)?***

- All Water Board monitoring programs are included in the Central Valley Monitoring Directory. Water Board staff are maintaining the information in the directory (currently a bit behind because of staff losses). Long term funding for the directory is uncertain.
- The Delta RMP is in the process of more thoroughly and effectively coordinating monitoring from Regional Board required monitoring with other agency monitoring programs in the Delta and in some cases possibility upstream of the Delta.

***How is your monitoring financed and how stable is it?***

- Regional SWAMP funded by waste discharge fees (fairly stable). These go to the state and then get doled back out.
- Statewide SWAMP = EPA 106 (fairly stable)
- The possibility that regional SWAMP activities will be cut from the budget is regularly heard.

***What types of assistance do you receive or would you like to receive to enhance your monitoring?***

- SWRCB and SWAMP are budgeted through June 2014. The CWQMC is promoting its web portals to assess data and as tools to communicate with a broader audience. They hope to gain support and funding to develop and expand these portals.
- Best bet: The CWQMC's Estuaries Workgroup is developing an estuaries portal which may help to better synthesize information across programs and potentially identify data gaps.

***Can SRWP get copies of recent monitoring reports?***

- 305(b) Integrated Reports are done every ~4 years. Previously, there were inconsistencies among regional boards and long delays before USEPA approves them. The ideal process is to pull data directly from CEDEN instead of requesting.
- Safe to Swim reports are published on the Water Board's website.
- The CWQMC's Safe to Swim portal doesn't pull from CEDEN – it pulls beach data and shows listings from the most recent Incidence Report. But they plan to link it to CEDEN.
- The two ILRP coalitions produce annual monitoring reports that, along with the data, are available at [www.waterboards.ca.gov/centralvalley/water\\_issues/irrigated\\_lands/monitoring\\_plans\\_reports\\_reviews/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/monitoring_plans_reports_reviews/index.shtml).

**Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- Public/swimming
- Mercury
- Drinking water quality

- Pesticides
- Nutrients
- Pathogens
- Beneficial use for fish – temperature/turbidity/toxicity. Of these the most important is temperature. Many streams have marginal temperatures for cold water species. Influenced by reservoir releases, irrigation tailwater, and diversions.
- A major issue for CV-SALTS is applying drinking water criteria to agricultural drains. A special study is monitoring 2x/month. Stakeholders are also drafting a Basin Plan Amendment to change how the criteria are set and applied.

***How are current monitoring activities helping to address these issues?***

- E. coli monitoring helps address swimming uses.
- DWR is monitoring mercury, nutrients, and more to assess trends in conditions.
- ILRP coalitions are monitoring ag runoff.

***Are there critical information gaps that prevent us from better addressing these issues?***

- No fish monitoring for mercury bioaccumulation.
- Quarterly monitoring at fixed sites isn't identifying sources.

***What would you recommend to better address these issues?***

- Better data management
- Effective information dissemination and accessibility.
- Develop a system to pull data from all databases. Standard state base map for portals.
- The IRs should be more useful. Currently checklist but should be in depth.
- Lacking assessment. Have data without useful assessment.
- Local efforts lack some oversight. ILRP getting better.

**Regional Monitoring Questions**

***What other monitoring and assessment activities are most useful to you?***

- Toxicity testing is useful to help understand and identify where there may be compounds that are impacting beneficial uses and are not yet being addressed.

***How satisfied are you with the level of water quality monitoring in the watershed?***

- The answer depends entirely on the goal. Overall, our regulatory needs are being satisfied with the level of monitoring in the Sacramento River Watershed. Although there remain unanswered questions, we are not dissatisfied with the level currently occurring.

***How do you think monitoring in the Sacramento River Watershed could be improved?***

- Funding needs to accompany legislation that establishes new requirements and mandates.

***What benefits do you see in coordinating your monitoring activities more closely with other agencies/organizations?***

- Improve database comparability regionally and statewide (through the CWQMC).
- Allow for more holistic analyses of the ecological systems and potential impacts

***What types of regional monitoring functions might benefit your efforts?***

- Pulling together all data sources with some consistency.

- Standards re: how to assess the data.
- Assessing the data compiled.

***What are potential opportunities for improved monitoring coordination in the watershed?***

- Need program to consistently gather uniform data. (similar to USFS gaging stations)
- Gather water quality data to identify trends.
- Look at use available funds more efficiently.
- Just compiling and assessing would be a good starting point....
- Just look at mainstem not tributaries for a pilot project (ex. Klamath project)

**Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- Communication
- Organization
- Funding
- Assessment functions

***How would you suggest an RMP could be supported and organized?***

- [No response]

***Who may we be missing in our list of stakeholders?***

- USACOE? Seem to have everyone else.
- Will contact if we think of others.

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- [No response]

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- The Regional Board is highly supportive of regional monitoring efforts, so it is possible that the Board would commit to a program.

***For Regulators & Other Stakeholders***

**Regulations, Policies, and Programs**

***What monitoring activities would be useful for regulatory programs (e.g., ILRP, TMDLs, NPDES permits)?***

- All those listed in response to the first question.

***What related policy / regulatory programs and activities should this RMP development effort coordinate with?***

- Delta RMP development effort.
- Phase II MS4 permit.

*What monitoring efforts would be useful for other watershed-scale programs?*

- [No response]

### **Stakeholder Facilitation**

*What regulatory authority do you have to require or allow participation in an RMP?*

- Stating in funding agreements that data will be entered into CEDEN.

*How do you write permits to require, encourage or allow participation in an RMP?*

- Permits can include language that require or encourage participation in an RMP.

*What are your interests in and concerns with doing so?*

- As yet there is no such RMP. And if there is one, it would have to be officially recognized.
- Coordinated effort needs to be recognized in permits.

### **Values and Contributions**

*What value would an RMP provide to your agency?*

- Assessments would be particularly useful.

*Would you fund an RMP from relevant fees?*

- This is entirely dependent on the nexus of the expected/resulting work with the sources of particular fees.

*How would your agency participate in an RMP (funding, in-kind support, advice)?*

- Yes, yes and yes.
- There is a lot of support statewide for RMPs right now.
- We would not take lead but would coordinate to the extent we can.
- The Water Board is seriously lacking staff and funding these days.

## **RMP Interview Q&A – Bev Anderson-Abbs and Scott McReynolds (DWR) by Holly Jorgensen (SRWP) and Stephen McCord (MEI); 30 Jan. 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- We are in our 2<sup>nd</sup> round with SWAMP funding for labor & travel.
- DWR Bright lab can analyze for THg (total & dissolved, monitoring since 1998) and almost all other constituents.
- DWR samples quarterly at 44 stations as far south as Verona; all sites are mapped as kmz files on the WDL web site (also on CV Monitoring Directory).
- DWR's original monitoring plan and QAPP (2009-2012) are available at [http://www.swrcb.ca.gov/rwqcb5/water\\_issues/swamp/sacramento\\_river\\_basin/](http://www.swrcb.ca.gov/rwqcb5/water_issues/swamp/sacramento_river_basin/). The current plan and QAPP are not currently posted on the SWAMP portal. The monitoring is similar to the past 20 years of monitoring.
- We collect E. coli samples for Regional Board use.
- Also monitor surface flows for flood protection & groundwater levels for surface water interactions.
- Also conduct snow surveys to project summer allotments.
- Monitor temperature & salinity for ag and drinking water interests.
- Also cover North Coast, Clear Lake, Klamath; also monitor groundwater levels and quality. They run a 5-6 year rotation of major groundwater basins within the Northern Region. Each basin is sampled once every 5-6 years for quality. Levels are monitored at least annually for all monitored wells. Some specific wells may be monitored more frequently as necessary. Level data are collected and managed by the Northern Region Office's Data Management Section.

#### ***Why are you monitoring (what regulations and authorities require it)?***

- Primarily support State Water Project interests.
- Have done Sites Reservoir studies (North of Delta Off-stream Storage or "NoDOS") for the past 15 years (maybe part of next water bond).
- Only FERC relicensing-related monitoring currently is temperature (for dam operators to meet downstream criteria). Oroville settlement agreement and 401 WQ Certification already in place. After FERC relicensed, will be collecting fish every 5 years in Oroville for BOG.

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- More & stable funding for in situ continuous monitoring of field conditions.
- Biological indicator monitoring (BMI) for regional screening, then focus grab sampling and sensors in hot spots.
- Fish bioaccumulation (sampled & reported in 2000) using electro-shocker (will get boats for Lake Oroville & downstream river).
- Funding to monitor additional locations
- Multi-parameter data recorders as opposed to grab samples.
- Concerns with how the data is used. Would like to see analysis performed and products (reports, etc.) generated.

- Meaningful remediation needed.

***Where are your data stored and how are those data made available to others?***

- Post most data on WDL but no assessment or reporting.
- Whole Effluent Toxicity, bacteria and benthic macroinvertebrates (BMI) data can't be uploaded into WDL. These data are managed by SWAMP and should be available on CEDEN.
- WDL includes QC'ed continuous flow/discharge data from CDEC and NRO continuous Hobo logger (water temperature) data using Hydstra.
- WDL includes QC'ed continuous data from CDEC using Hydstra.
- Do not post FERC relicensing-related monitoring data publicly; must request through written process until FERC licensed.

***Do you coordinate your monitoring with others (and if so, how)?***

- Don't really coordinate, although staff participate in IRWMP efforts.
- USBR not coordinated, not monitoring, not fixing curtain in Whiskeytown Lake.
- Supported US Forest Service/CA DFW by monitoring Eagle Lake once for vertical profiles field measures & full WQ at near-surface & near-bottom, 4-5 locations. Plan to sample again next summer to sample lake when stratified.
- Monitor Clear Lake 7x/yr, vertical profiles field measures & full WQ at near-surface & near-bottom, multiple locations.
- Klamath coordination is a good example of improving coverage & communication and reducing redundancies. Link: <http://kbmp.net/>.

***How is your monitoring financed, and how stable is it?***

- DRW long term program is financed by General Fund.
- Currently SWAMP's Sacramento Watershed Trends Monitoring.
- State regularly cuts funding, so SWAMP filled that gap.
- FERC relicensing for Oroville will require monitoring for BG algae, temp (toughest criteria), metals including Hg, minerals, nutrients, fish tissue contaminants, bacteria, and habitat. Additional work will include outreach to educate public of risks of fish consumption and how to reduce human bacteria levels at recreational swim areas, as well as posting when bacteria levels are high.

***What types of assistance do you receive (or would you like to receive) to enhance your monitoring?***

- In addition to general funds for sensors, lab analyses and equipment, just SWAMP funding (through June 2014).

***Can SRWP get copies of recent monitoring reports?***

- DWR has not produced any reports except "Mercury Contamination in Fish from Northern California Lakes and Reservoirs" (June 2007).

**Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- Metals: mercury, arsenic, aluminum

- Temperature (reservoir operations, climate change)
- Nutrients & eutrophication (periphyton, algae)

***How are current monitoring activities helping to address these issues?***

- Long-term dataset (since 1970s) for trends assessments.

***Are there critical information gaps that prevent us from better addressing these issues?***

- More continuous temperature sensors at existing stage gages.
- BMI monitoring would help to identify hot spots.

***What would you recommend to better address these issues?***

- Data analysis & reporting is lacking.

### **Regional Monitoring Questions**

***What other monitoring and assessment activities are most useful to you?***

- Nothing comes to mind.
- PG&E won't share their data.
- Nothing from USBR.
- Regional Board office in Redding seems uninterested in coordinating.

***How satisfied are you with the level of water quality monitoring in the watershed?***

- Good coverage of main stem & major tributaries with SWAMP funding.
- Need to use the data. Going to need mercury data for TMDLs and remediation.

***How do you think monitoring in the Sacramento River Watershed could be improved?***

- Reservoirs could use more.
- Need to tie monitoring to adaptive management (monitoring pre- and post-projects, over climate changes, over reservoir operating rule changes).
- Monitor other aspects of conditions (geomorphology, etc.)

***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- Especially assessment and reporting.

### **Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- Funding, supporting others' interests
- Need funding to analyze and report not just collect data.

***How would you suggest an RMP could be supported and organized?***

- DWR can provide staff expertise, lab analyses, and data analyses. We have discretion with general funds.
- DWR can sample fish and benthic macroinvertebrates.

***Who may we be missing in our list of stakeholders?***

- PG&E and SMUD for their FERC licenses.

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- Good to know that this effort is in progress to coordinate monitoring various stakeholders.
- Do a monitoring gap analysis.
- Mercury monitoring must be a part of an RMP
- Mercury monitoring objectives are focused on management and not necessarily removal. Lake Combie pilot project w/centrifuge is a good example of an effort to remove. Look for more solutions like that.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- Do not have any currently, but DWR can sign MOUs if helpful.

## **RMP Interview Q&A – Debra Denton [in person] and Tim Vendlinski [review] (USEPA) by Stephen McCord (MEI); 8 Feb. 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- EPA is helping to support the Regional Board, through its 106 workplan, a special study at DWR's Hood station on the Sacramento River. The study, which was being managed by Regional Board staff, is conducting –ex-situ toxicity testing in junction with cellular and molecular biomarkers for larval fish and invertebrates. The goal is to examine the exposure and effects over a 14-day period to evaluate the acute and chronic effects of fish and invertebrates at a key integrator site. The study includes:
  - 3 independent events of two back-to-back 2-week exposure periods for larval-stage fish
  - Water (CDFW), tissue (UC Davis), histopathology (UC Davis)
  - USGS has a new analytical tool for measuring concentrations of a suite of 60 pesticides in fish tissue. This tool may be tested by SFCWA
- USEPA is supporting development of a San Joaquin RMP (Valentina Cabrera-Stagno)
- USEPA is supporting development of a Delta RMP (Valentina Cabrera-Stagno, Erin Foresman, and Tim Vendlinski)
- USEPA serves as a partner with other federal and State agencies under the Interagency Ecological Program (<http://www.water.ca.gov/iep/>) to advance our collective understanding of how water diversions, contaminants, ecosystem dynamics, etc. are affecting fish populations (Erin and Tim).
- USEPA serves on the Joint Board encompassing the San Francisco Estuary Institute – Aquatic Science Center (<http://www.sfei.org/>) that are together advancing a range of research and monitoring efforts designed to lead to more coherent management of the Bay Delta ecosystem.
- Previously EPA has funded efforts through its Regional Applied Research Efforts (RARE) program such as the development of SOP for collecting and sampling for pyrethroids.

#### ***Why are you monitoring (what regulations and authorities require it)?***

- Clean Water Act
- No real link with CERCLA (esp. Iron Mtn. Mine clean up effectiveness)
- Integrator site at Hood is useful for trends and provides easy access

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- Provide more tech support to others' monitoring: tools, methods, locations
- Link to critical species' habitat and life cycles co-occurrence and exposure/effects to stressor caused by land use changes.
- Relate monitoring questions and objectives to regulatory programs (CWA, FIFRA) and evaluate effects of actions underway
- Add value by facilitating collaboration and providing expertise

- Apply models to predict impacts of climate change such as on pest changes and potential runoff patterns
- Link monitoring to simulation models to (1) confirm monitoring data [where and when to monitor], and (2) fill in monitoring gaps. Waterborne, Inc., applied EPA's pesticide root zone model (PRZM) to predict mass loading potentials for eight pesticides (Dasgupta et al., 2008).
- Need better links to program effectiveness (TMDLs, DPR Pesticide Use Reports, CERCLA) and promotion of effective ones.

***Where are your data stored and how are those data made available to others?***

- Most efforts that USEPA supports through the state produce SWAMP-comparable datasets which can be uploaded to CEDEN, which then can be uploaded (or linked) to USEPA's WQX (Water Quality Exchange) database
- Modeled 38,000-acre area to estimate the effectiveness of DPR's new (~2002) dormant spray regulations and found ~50% load reduction of diazinon; extra weight of evidence helped lead to delisting diazinon and chlorpyrifos (Synder et al., 2011).

***Do you coordinate your monitoring with others (and if so, how)?***

- USEPA is always looking for opportunities to support coordination through RMPs.
- USEPA's role in monitoring is generally to support others' efforts, which by its nature is a coordination role.
- USEPA participates in the California Water Quality Monitoring Council and is involved with the State Board's SWAMP.

***How is your monitoring financed, and how stable is it?***

- Grants for which USEPA Region IX competes for (e.g., RARE, RM) or is apportioned (e.g., 104 and 106 funds) nationally vary annually in successes and allocations with every change in administration and legislative budget
- USEPA staff also provide ad hoc support for others to find and apply for federal grants
- USEPA funds ~\$4.5 million/year in competitive 319(h) grants to CA to implement adopted TMDLs.

***What types of assistance do you receive (or would you like to receive) to enhance your monitoring?***

- Opportunities to help coordinate others' activities and provide technical assistance, as needed

***Can SRWP get copies of recent monitoring reports?***

- USEPA staff spearheaded a project funded by CALFED (Hooweg et al., 2011) to develop the model, CoPST (Co-occurrence of Pesticide and Species Tool) that predicts pesticide potential loadings and models co-occurrence of pesticides in the environment with 12 threatened and endangered species. This assessment shows the intersection in time and space of aquatic species and pesticide use. Resources agencies tasked with protecting aquatic species can use this tool to optimize monitoring times and locations, and focus application of BMPs to mitigate pesticide loadings. The information could also be parsed out for risk managers attempting to understand the specific locations of higher co-occurrence of a particular species and a particular pesticide or the joint co-occurrence of

multiple pesticides in the same class (i.e., pyrethroids). This work demonstrates how to link changes in land use (i.e., pesticide application) to trends in monitored conditions.

- USEPA's recent Bay-Delta Action Plan (<http://www2.epa.gov/sfbay-delta/bay-delta-action-plan>) includes recommendations addressing monitoring.
- Agricultural issues white paper (~2004?) interviewed agricultural interests regarding monitoring & related issues.

### **Sacramento River Watershed Water Quality Issues**

*What are the major water quality issues of concern to you?*

- Pesticides (including the interaction of the AI+ inerts and their degradates)
- Toxicity (water and sediment), including swimming performance sublethal endpoints
- Climate change effects
- Molecular level indicators of stressors (e.g., Vtg, histopathology, various gene expression responses)

*How are current monitoring activities helping to address these issues?*

- Identify trends (both forecasting and hind-casting)
- Look for effectiveness

*Are there critical information gaps that prevent us from better addressing these issues?*

- Link biomarkers to water quality, like the study at Hood is aiming to do
- Further enhance and develop TIE fingerprints to identify current use pollutants as causes of toxicity

*What would you recommend to better address these issues?*

- Look upstream and on the landscape to characterize the optimal placement of BMPs
- Evaluate DPR label changes and new surface water regulations
- Predict climate change effects and its interaction on influences of chemical and biota stressors changes
- Conduct special studies (e.g., the biomarker study, modeling studies, analyzing pesticide levels in tissue) to develop and apply integration tools

### **Regional Monitoring Questions**

*What other monitoring and assessment activities are most useful to you?*

- Modeling
- Trends, including climate change effects
- Land use link

*How satisfied are you with the level of water quality monitoring in the watershed?*

- Not very, but perhaps only because nothing is being reported.

*How do you think monitoring in the Sacramento River Watershed could be improved?*

- Upload SRWP data into CEDEN.
- Conduct assessments and synthesis to be useful and relevant
- Coordinate and provide technical support to disparate activities
- Provide a broader view of the watershed (land use, biological relevance)

***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- All of those (communication, coordination, assessment and reporting)

### **Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- The opportunity to collaborate with and support all major stakeholders
- Improve decision-making with better assessment of performance measure effectiveness

***How would you suggest an RMP could be supported and organized?***

- USEPA grants can enhance baseline activities, but should not be relied upon as stable or sustainable.
- USEPA staff are always available for technical support
- USEPA staff are always looking to facilitate collaboration among stakeholders

***Who may we be missing in our list of stakeholders?***

- DWR's IEP lead
- Nonprofits such as The Nature Conservancy
- State Board – Office of Information Management Assessment

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- See USEPA's ANPR Bay-Delta Plan

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- [not addressed]

## **For Regulators & Other Stakeholders**

### **Regulations, Policies, and Programs**

***What monitoring activities would be useful for regulatory programs (e.g., ILRP, TMDLs, NPDES permits)?***

- Coordinate monitoring activities with current regulatory program such as NPDES permits, various State general permits (e.g., vector control), ILRP and TMDL development and implementation.

***What related policy / regulatory programs and activities should this RMP development effort coordinate with?***

- State Board – Office of Information Management Assessment (oversees and implements SWAMP and CEDEN).

***What regional monitoring efforts would be useful for other watershed-scale programs?***

- [not addressed]

### **Stakeholder Facilitation**

***What regulatory authority do you have (and could you use) to require, encourage, or allow participation in an RMP?***

- Clean Water Act NPDES permits

***What are your interests in and concerns with doing so?***

- [not addressed]

### **Values and Contributions**

***What value would an RMP provide to your agency?***

- Coordinate monitoring activities with current regulatory program such as NPDES permits, various State general permits (e.g., vector control), ILRP and TMDL development and implementation.

***How could you help to fund an RMP?***

- Nothing long-term, as USEPA grants are time-limited. For special studies, 319(h) grants are available for addressing TMDLs. Also see next question.

***How would your agency participate in an RMP (fund, in-kind, advise)?***

- As we have in the past under the SRTPCP as a USEPA funded grant ~ \$8.5 million. USEPA can provide in-kind technical support and facilitate looking for funding opportunities.

### **REFERENCES:**

- Hoogeweg, C.G., W.M. Williams, R. Breuer, D. Denton, B. Rook and C. Watry 2011. Spatial and Temporal Quantification of Pesticide Loadings to the Sacramento River, San Joaquin River, and Bay-Delta to Guide Risk Assessment for Sensitive Species. CALFED Science Grant #1055. Nov, 2 2011. 293 pp.
- Dasgupta S., J.M. Cheplick, D.L. Denton, J.J. Troyan, W.M. Williams 2008. Predicted runoff loads of permethrin to the Sacramento River and its Tributaries. In: Synthetic pyrethroids: fate and effects. Eds: Gan J, Spurlock F, Hendley P, Weston D.
- Hladik, M.L., J.L. Orlando, and K.M. Kuivila, 2009. Collection of Pyrethroids in Water and Sediment Matrices: Development and Validation of a Standard Operating Procedure, USGS Scientific Investigations Report 2009-5012, 22 pp.
- Synder N.J., W.M. Williams, D.L. Denton, and C. Bongard 2011. Modeling the effectiveness of mitigation measures on diazinon label. In: Goh KS, Bret BL, Potter TL, Gan J (Eds.) *Pesticide Mitigation Strategies for Surface Water Quality*. ACS Symposium Series 1075. American Chemical Society, Washington, DC. pp. 29-37.

### **Additional notes on modeling and monitoring:**

- It is paramount for the comprehensive monitoring program that chemical models be developed to assess spatial and temporal chemical loadings to the watershed, thereby to evaluate the feasibility and effectiveness of monitoring programs and mitigation measures. Model development should be used hand-in-hand with monitoring data to better evaluate where and when to monitor within a watershed. Models can be used to

identify source areas and high risk waterbodies, optimize where and when to focus monitoring efforts, and target BMP research projects and mitigation measures. Models have the ability to forecast changing trends in land use, pesticide use, and climate. In addition, models can be used to evaluate the feasibility and effectiveness of mitigation measures prior to their implementation. In combination, these tools provide risk assessors with a “weight-of-evidence” approach for regulatory decision-making to address the wide array of contaminants and large geographical area that exceed the capacity of any individual program. Therefore, efforts are needed to tailor monitoring and assessment for existing regulatory programs, as well as provide POD investigators with needed information about pesticide peak loadings (as a parameter to model initially). For example, a model to assess both spatial and temporal pesticide loadings to the Delta was developed through a CALFED study (William et al., 2008; Dasgupta et al., 2008). The foundation of this pesticides model (land use, weather, hydrology, topography) could then be applied to other constituents (nutrients, metals, etc.).

- Our existing baseline and regulatory based programs (i.e., NPDES, ILRP) need to continue monitoring for chemicals of concern, including both emerging chemicals and current use pesticides such as pyrethroids, using analytical methods with MDL at toxicologically relevant levels of concern. They should also apply the USEPA toxicity test methods to evaluate for both acute and chronic endpoints at a frequency that will capture the exposure of adverse effects. They should also follow proper QA/QC, respond promptly to toxic responses with TIE, report in a standardized format, and upload to a publicly accessible database.
- Beyond these baseline and regulatory programs, we need to develop models to inform us where and when we should be testing for pollutants and their toxic effects, including sublethal endpoints (e.g., swimming performance), and biomarkers, along with *in situ* exposures as needed in pertinent locations.

## **RMP Interview Q&A – Joe Domagalski [Contaminants plus NAWQA], Michelle Hladik [Pesticide Fate Group], Charlie Alpers [Mercury] (USGS) by Stephen McCord (MEI) and Holly Jorgensen (SRWP); 15 February 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- 1<sup>st</sup> cycle was part of a baseline, national survey. 2<sup>nd</sup> cycle continued trends monitoring plus focused on five research areas (agricultural contaminants transport, aquifer contaminants, nutrients, urbanization effects, and mercury). The national mercury studies focused only on eastern U.S. sites with atmospheric deposition as the major input.
- NAWQA is now starting its 3<sup>rd</sup> cycle. It has dropped or reduced funding for many staff (including Joe). Funding levels may change over the course of the cycle. Michelle's lab will do sediment analyses for the regional Midwestern Synopsis.
- USGS's monitoring includes both special studies and regular/baseline monitoring.
- NAWQA's only current Sacramento watershed monitoring site is the Sacramento River at Freeport. Staff are continuing long-term trends monitoring at the watershed's integrator site (18-20 depth integrated samples/year). This site is also part of the National Stream Quality Network. Analyte classes include field measured parameters (pH, alkalinity, specific conductance, alkalinity) nutrients, chloride, sulfate, DOC, and rice pesticides. Mercury is not monitored.
- Bi-weekly water column sampling of current-use pesticides in Sac R and San Jo R inputs to Delta for one year (ongoing). This is an independently funded study and not part of NAWQA, although samples are collected at the same time as NAWQA. Some pesticides specific for use in California are analyzed here. An add-on study component may also analyze pesticides in fish tissue.
- USGS has installed (and continues to monitor and maintain) hundreds of stream gages, many with remote communication.
- Some special studies monitoring in Suisun Bay related to the occurrence of pesticides.

#### ***Why are you monitoring (what regulations and authorities require it)?***

- USGS is not regulated as a discharger.
- USGS is supporting the Department of Water Resources as it complies with requirements in the Delta MeHg TMDL to study mercury load reduction in the Cache Creek Settling Basin.
- USGS is supporting the State Board's efforts to develop a statewide mercury TMDL by evaluating potential factors that contribute to the range of mercury levels in fish in Sierra Nevada reservoirs.

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- Integrated watershed assessments would be useful for understanding contaminant sources and transport in the hydrologic system. Monitoring and modeling would both be key tools to undertaking such assessments. USGS is focused on nutrients (N, P, C) and suspended sediments. Modeling will help in projecting climate change effects on the watershed's hydrology and contaminant transport.

- Nitrate, organic carbon (absorbance fluorescence), Chl a, and turbidity continuous sensors would be useful if more widespread. USGS could install sensors at their existing stream gage stations for minimal extra cost.
- Utilize technology that Carbon group is using = DOC – designed for focus studies (cost savings after proven effective)
- Relationship between FDOM and methylmercury.

***Where are your data stored and how are those data made available to others?***

- Nearly all data collected by USGS are uploaded to NWIS: water quality, surface and groundwater quality, streamflow, continuous records (real-time and validated three months after as “published”).
- State-funded projects must provide SWAMP-comparable data, and sometimes they provide data in SWAMP-compatible format.
- Some of the data goes into reports.
- Biological data go into a biological database. Data can be made available upon request, but there is currently not an easy way to retrieve on the web for people outside of USGS.

***Do you coordinate your monitoring with others (and if so, how)?***

- USGS is generally interested in symbiotic relationships with other monitoring and study efforts.

***How is your monitoring financed, and how stable is it?***

- The sources of USGS funding are national programs, such as NAWQA, and State-wide cooperators. Cooperator funding comes from public agencies throughout California.
- USGS staff may get furloughed if the federal budget gets sequestered.
- Many studies are funded by other agencies: DWR’s study of the Cache Creek Settling Basin; State and Federal Contractors Water Agency funding of pesticides at Delta inputs.
- Stream gages are sometimes funded by local agencies interested in a gage; other times it’s from USGS general funds.
- USGS hires “Observers” to sample TSS for calibration of turbidity sensors and to report hazards or malfunctions.

***What types of assistance do you receive (or would you like to receive) to enhance your monitoring?***

- General coordination and communication with local partners helps to improve monitoring designs and the relevance of study components.
- USGS volunteer/observer program – 2 week training program.

***Can SRWP get copies of recent monitoring reports?***

- USGS reports are generally available on-line.

**Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- Groundwater levels and quality are concerns largely because they are relatively poorly characterized in the watershed.
- Climate change will have unknown effects on local hydrology and contaminant transport.
- Aquatic/terrestrial interface is often overlooked.

***How are current monitoring activities helping to address these issues?***

- They are not – they are a concern because of their uncertainty.

***Are there critical information gaps that prevent us from better addressing these issues?***

- Calibration of watershed models, such as SPARROW could be improved by more comprehensive and long-term modeling throughout critical watersheds, such as all tributaries to the Delta.
- In compiling all available data for mercury in the Sierra Nevada, Charlie found fewer than 100 sites, and very rarely were water (dissolved and filtered particles), sediments, and biota sampled concurrently.

***What would you recommend to better address these issues?***

- Groundwater modeling (transport, water quality assessment, principle aquifers), which USGS is planning to do, will help to characterize current and potential future conditions.

**Regional Monitoring Questions**

***What other monitoring and assessment activities are most useful to you?***

- Long-term monitoring of trends to assess watershed-wide issues and support watershed models. Continued and expanded use of real-time water quality instrumentation especially those for nitrate, organic matter, and where appropriate, chlorophyll-a.

***How satisfied are you with the level of water quality monitoring in the watershed?***

- Could be improved upon.

***How do you think monitoring in the Sacramento River Watershed could be improved?***

- The most important recommendation is to sample a broader, more comprehensive suite of constituents and matrices in case they are need to evaluate correlations and proxies.
- More comprehensive and distributive data that is easily accessible.
- Database integration. Too many databases and data isn't always transferred.
- Data compatibility is an issue.

***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- Communication and coordination would help to keep USGS projects and programs connected and relevant to local interests and conditions.

**Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- Coordination with other monitoring programs, particularly DWR
- Opportunities to provide technical expertise.

***How would you suggest an RMP could be supported and organized?***

- Not sure. USGS does not fund other programs. USGS can provide some in-kind assistance, such as meeting attendance and participation in technical advisory groups.

***Who may we be missing in our list of stakeholders?***

- Brian Brown, Project WET (works for WEF) 916-444-6245

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- USGS Sac has great team of modelers, taking global scale models to Sac R watershed scale.
- Joe finishing SPARROW calibration for TN, TP based on year 2002 data for annual load by subwatershed scale. Dynamic version looks seasonally.
- Staff check & take discharge measurements at all stage gages monthly. In so doing, they also could collect samples.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- Not sure. USGS cannot guarantee participation locally when program and budget decisions are made nationally.

## **RMP Interview Q&A – Vyomini Pandya, Jason Lofton, and Linda Dorn (SDA), Brian Laurenson (LWA), Dave Tamayo (Sacramento Co.) by Stephen McCord (MEI); 25 Feb. 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- Four sites: two upstream of the Sacramento urban area (American River at Nimbus; Sacramento River at Veterans Bridge) and downstream (American River at Discovery Park; Sacramento River at Freeport). No longer monitoring at River Mile 44 except for a few constituents.
- SRCSD is also implementing discharge and receiving water characterization studies in alternate years.
- The stormwater program (Partnership) also monitors urban tributaries.
- Frequency: Monthly for SRCSD for the characterization study years. CMP monitoring frequency has been reduced to four events/year (3 wet and 1 dry) then monthly in alternate years (the characterization studies).

#### ***Why are you monitoring (what regulations and authorities require it)?***

- NPDES waste discharge permits (Partnership for stormwater; SRCSD for wastewater).

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- SRCSD should stop monthly monitoring for intensive characterization studies and be able to remove constituents that are not of concern and reduce frequency of monitoring.
- Partnership is developing suggested changes to discharge and receiving water monitoring (especially toxicity testing); replace some with continuous sensors; model to replace annual intensive monitoring.

#### ***Where are your data stored and how are those data made available to others?***

- Request CMP data through Vyomini.
- Downtown Sacramento's combined sewer system's routine monitoring event data go into CIWQS; annual monitoring event data are submitted to the Regional Board but not uploaded.
- Partnership data are submitted to the Regional Board in SWAMP-comparable format, but are not uploaded to CEDEN.
- All SRCSD data are uploaded to CIWQS.
- Partnership and SRCSD data are all in their own, comprehensive, internally accessible databases.

#### ***Do you coordinate your monitoring with others (and if so, how)?***

- Partnership (7 municipalities) is regulated under one NPDES permit. Each municipality has program staff that track their activities and report on their compliance. Collective efforts and contracting are through Sacramento City and County staff.
- The CMP submits its data for 305(b) reports.

#### ***How is your monitoring financed, and how stable is it?***

- SRCSD's funding through rate-payers is very stable.

- Some Partnership members have stormwater utilities, others just general funds allocated to permit required activities. Fees to the Partnerships are based on population.
- The CMP MOU includes a cost-share agreement.

*What types of assistance do you receive (or would you like to receive) to enhance your monitoring?*

- Citrus Heights just got a Prop. 84 grant. The Partnership is providing in-kind match funds. Grants are always welcome for enhancing activities.

*Can SRWP get copies of recent monitoring reports?*

- Latest version for CMP is a tech memo posted on the CMP web site. The memo and data are also submitted with the Partnership's annual reports.

### **Sacramento River Watershed Water Quality Issues**

*What are the major water quality issues of concern to you?*

- Productivity in the Sacramento River
- Pesticides
- Pathogens
- Relative contributions of whatever pollutants are identified as significant (for source identification and characterization)
- Well-characterized nutrient (all nitrogen species) data in the Sacramento River

*How are current monitoring activities helping to address these issues?*

- Looking for emerging contaminants of concern
- SRWTP is doing a receiving water characterization study under its current NPDES permit (full SIP list, plus others) monthly in alternate years starting in 2013.
- Coordination between the Partnership and SRCSD is proactively done by the CMP

*Are there critical information gaps that prevent us from better addressing these issues?*

- We need more appropriate, accessible data for modeling water quality into the Delta.
- Pathogen data are largely lacking.
- Sediment toxicity is generally unknown.
- Productivity in the lower Sacramento river is generally unknown

*What would you recommend to better address these issues?*

- The Lower Sacramento River report card was not cost-shared, so minimal utility in the short-changed final product. The Feather River report card was more extensive, but also much more expensive.
- Pulse of the Watershed would be a useful product if similar to San Francisco Bay's. It could include timely articles by technical experts and a "report card" type assessment.
- New weed control pesticide monitoring will be required by water agencies and reclamation districts under the new Aquatic Pesticides Application General Permit

### **Regional Monitoring Questions**

*What other monitoring and assessment activities are most useful to you?*

- A Pulse-type document would be great.

- Useful CEDEN uploading (rather than CIWQS) and accessibility, which doesn't happen by itself.
- More coordination among stakeholders; not taking over monitoring.
- Support IRWMPs with pre- and post-implementation monitoring.
- CV-SALTS needs data for MUN de-designation. Apparently Regional Board staff is monitoring for Live Oak, Colusa, and Biggs.
- 

***How satisfied are you with the level of water quality monitoring in the watershed?***

- Not satisfied. There seems to be various monitoring activities, but it's not all shared, coordinated, or readily accessible.
- After supporting a decade of monitoring in the Sacramento River, stakeholders did not continue the program. Now there is a break in the data that complicates a trends analysis.

***How do you think monitoring in the Sacramento River Watershed could be improved?***

- Advocate for general permit flexibility that facilitates alignment and consistency among monitoring efforts.
- Leverage funds from multiple sources to implement a monitoring program.

***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- Get various entities monitoring in a consistent, comparable way.
- DWR's Hood station is an example of not coordinating sampling. Evidently the nutrient monitoring they will be doing does not include QA/QC, nor are we coordinating sampling events between SRCSD effluent and receiving water monitoring and their continuous monitoring.
- New project proponents should consider other uses of data that they could support with minimal additional effort.
- Special study archetypes by one may be applicable to others (e.g., aluminum site-specific objective in the San Joaquin, MUN de-designation). Sharing information about such studies and their results would facilitate knowledge transfer and reduce redundant efforts.

**Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- Ability to understand broader watershed issues.
- Base effort on real problems rather than perceived problems.
- An independent, science-based forum for prioritizing monitoring and assessment activities.
- A resource for information and technical support.
- Connect to the Delta RMP.

***How would you suggest an RMP could be supported and organized?***

- It cannot be supported by NPDES dischargers in the watershed alone, as there are not enough (different than SF Bay).
- NPDES permit fees already include a surcharge for SWAMP, so dischargers are already paying for watershed monitoring.

- Contractors and others interested in the Delta water quality may be interested in its main tributary. DWR is cost-sharing its SWAMP-funded monitoring in the watershed, so contractors are already paying for watershed monitoring. A project tax is being proposed for Delta efforts. Not sure how that would work in the watershed (basis, recipient).

***Who may we be missing in our list of stakeholders?***

- Added several potential interviewees: Karen Gehrts (Branch Chief for the Environmental Water Quality and Estuarine Studies Branch), Gregg Erickson, Chair, IEP Coordinators
- Bay Delta Region 3, California Department of Fish and Wildlife, 4001 North Wilson Way, Stockton CA, (209) 942-6071, Cathy Johnson (USFWS), Dave Duncan, Environmental Monitoring Branch, (916) 445-3870 (CA DPR), Rich Breuer (State Board).

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- Track CA Water Quality Monitoring Council activities to see if there are coordination/funding opportunities.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- Already have one for the CMP.
- Will be contributing to the Delta RMP so not sure what, if any, commitment SRCSD would have to the Sacramento River RMP, though we have contributed in the past.

## **RMP Interview Q&A – Debbie Webster (CVCWA Exec. Dir.) by Stephen McCord (MEI), 11 March 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- CVCWA members with NPDES permits monitor receiving waters per their permit requirements.
- Most permits require “characterization studies” with full-CTR set of constituents and increased frequency during one year of their permit.
- They also conduct special studies such as site-specific objectives (most commonly aluminum) and monitor additional times/stations/constituents as antidegradation analysis “extras”.
- Some dischargers are monitoring CV-SALTS related constituents (nutrients, salts).

#### ***Why are you monitoring (what regulations and authorities require it)?***

- The Regional Board is pushing additional monitoring through its recent de facto policy of designating agricultural drains as MUN (municipal drinking water supply sources). Dischargers must monitor to demonstrate that the designation is not applicable. CV-SALTS is potentially leading to unique objective for such drains, which applies to at least five POTWs.
- In most receiving waters, POTW effluent is cleaner for most constituents. More common exceptions are: disinfection by-products, salts, nutrients, CECs (pharmaceuticals, caffeine, etc.).

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- Cut unnecessary monitoring (i.e., where we are not learning anything). Some POTWs need 10-15% of their total operating budget for monitoring with redundant stations, never-detected constituents, and surface and GW components.
- An RMP could benefit stakeholders with more regional information when site-specific information is less relevant or less important with respect to the scale of the problem.
- An RMP could help to coordinate the timing of biota monitoring (biosentinels, biological indicators, toxicity testing) with water column sampling.

#### ***Where are your data stored and how are those data made available to others?***

- CIWQS includes both effluent and receiving water data, but not QA/QC.
- Ask Karen Larsen if CEDEN can extract CIWQS data. [emailed Karen 3/12/13]
- Every POTW > 1 MGD uploads to CIWQS; 2/3 of smaller POTWs also do.
- CIWQS is extremely cumbersome. Every permit change requires dozens of staff hours to upload anew to CIWQS.

#### ***Do you coordinate your monitoring with others (and if so, how)?***

- *Ad hoc* communications through CVCWA (personal communications with Debbie Webster; through contacts made in CVCWA meetings, etc.).
- CVCWA could lead or coordinate an aluminum SSO special study upstream of Shasta Reservoir, which will require substantial receiving water monitoring.

- Some municipalities coordinate at the municipal scale, such as with their stormwater program.
- Some municipalities coordinate with watershed programs, but likely not consistently.

***How is your monitoring financed, and how stable is it?***

- All POTWS pay into SWAMP via their 21% add-on to permit fees (minimum \$2500 per permit).
- Essentially all program funds come from rate fees to customers.
- Small communities now can get planning and special studies included in State Revolving Fund loans.

***What types of assistance do you receive (or would you like to receive) to enhance your monitoring?***

- CWEA specialty training events and operator certifications.
- CVCWA networking via Debbie Webster, newsletters, conferences.
- Working through the Rural County Representatives of California (<http://www.rcrcnet.org/rcrc/>) a State Board “circuit rider” provides training to small community POTW operators.

***Can SRWP get copies of recent monitoring reports?***

- Annual and quarterly permit compliance reports are all on CIWQS.

**Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- Salts and nutrients
- Bioassessment of benthic invertebrates as a component of sediment quality objectives. Initially, permits may require bioassessments. but future permits may include numerical objectives. Probably effects would trigger extraordinarily expensive (with low chance of success) “causal assessment” of flows, water column and sediment constituent concentrations, accidental spill checks, and more.
- Mercury, insofar as it is a common impairment; however, POTWs are minor point sources (at worst).
- CECs are an issue insofar as the non-standard methods for wastewater and receiving water matrices raise more questions than provide answers.

***How are current monitoring activities helping to address these issues?***

- Generally the value of monitoring is confirming non-effects of POTW effluent.

***Are there critical information gaps that prevent us from better addressing these issues?***

- Missing tributary contributions (vs strictly mainstem monitoring).

***What would you recommend to better address these issues?***

- An RMP could support regional assessments that feed into site-specific “causal assessments.”
- An RMP could provide a “big picture” assessment useful for all, putting all POTWs’ effluent into context.

## **Regional Monitoring Questions**

***What other monitoring and assessment activities are most useful to you?***

- Biggs, Willows, Colusa, and Live Oak need to demonstrate that their discharges are not impairing MUN beneficial use. CV-SALTS is leading an effort to evaluate current conditions.

***How satisfied are you with the level of water quality monitoring in the watershed?***

- Hard to answer when no one pulls it together and assess its value collectively.
- The regional SWAMP, which is funded by NPDES and general permit fees, is funding DWR monitoring. Because DWR's monitoring plan and data are not publicized, we have no idea whether the monitored constituents are connected to our interests. Because there is no assessment, we have no idea whether the results are telling anything useful.

***How do you think monitoring in the Sacramento River Watershed could be improved?***

- Sample at tributary mouths to put loads into context.
- Support WARMF model input, particularly in the Colusa Basin, for the Drinking Water Policy Workgroup. [The water management model WEAP may be useful.]

***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- #1: Coordination
- #2: Assessment & reporting
- #3: Communication

## **Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- Cost-savings from coordination
- Getting better information and a regional assessment for the same cost.
- Train and inform staff of the best methods, tools, and information available.

***How would you suggest an RMP could be supported and organized?***

- Don't rely on local communities to work independently.
- Recognize that POTWs can't lead others—need proportional participation from multiple stakeholders (irrigated lands).

***Who may we be missing in our list of stakeholders?***

- Karen Larsen, state SWAMP
- Redding office of Reg Bd
- POTW managers: Redding, Chico, Yuba City, Roseville, EID
- Lots of small dischargers who lie along the Sierra foothills
- Tess Dunham, representing many POTWs in the region

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- Avoid May 15 for Forum (CVCWA annual conference); May 16 for CV-SALTS

- Address concerns about permit liability. Compliance monitoring requires significant trust and reliability. Errors by a collaborator do not shift their responsibility.
- Toxicity testing often showed hits, but for unknown causes. Cleaner water is a more sensitive condition for toxicity testing.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- Depends on what it would contain, which would need to be confirmed by the CVCWA board.

## **For Regulators & Other Stakeholders**

### **Regulations, Policies, and Programs**

***What monitoring activities would be useful for regulatory programs (e.g., ILRP, TMDLs, NPDES permits)?***

- Address 303(d) listings and constituents that have NPDES permit limits.
- Salts and nutrients: baseline assessment, modeling to anticipate costs-benefits, and outcomes/effects of BPM implementation.

***What related policy / regulatory programs and activities should this RMP development effort coordinate with?***

- CV-SALTS
- Bioassessments
- Toxicity testing and TIEs

***What regional monitoring efforts would be useful for other watershed-scale programs?***

- Coordination for regional-scale studies
- Coordination with other “spheres”: atmospheric deposition, forest management, agricultural lands

### **Stakeholder Facilitation**

***What regulatory authority do you have (and could you use) to require, encourage, or allow participation in an RMP?***

- None, but CVCWA represents most POTWs collectively.

***What are your interests in and concerns with doing so?***

- Key role of CVCWA is to support POTWs’ interests.
- CVCWA can provide critical information regarding POTWs.
- CVCWA members would be concerned if an RMP becomes just another mandatory program with minimal benefit and additional liability associated with others’ actions.

### **Values and Contributions**

***What value would an RMP provide to your agency?***

- Provide context to POTWs’ contributions to receiving waters; even recognizing the value of POTWs in protecting water quality.

***How could you help to fund an RMP?***

- CVCWA members could cost-share and provide in-kind services.
- CVCWA could help fund efforts that support POTWs' needs in the region.

***How would your agency participate in an RMP (fund, in-kind, advise)?***

- Debbie Webster could participate in meetings and distribute messages to CVCWA members.
- CVCWA could coordinate representatives of all POTWs (e.g., 3 seats in Delta RMP Steering Committee) and work towards consensus within the POTW sector.

DRAFT

## **RMP Interview Q&A – Bruce Houdesheldt (NCWA) and Claus Suverkropp (LWA), by Stephen McCord (MEI) and Holly Jorgensen (SRWP); 18 March 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- NCWA manages the Sac Valley WQ Coalition, which includes 12 subwatershed groups covering about 1.2 million irrigated acres.
- NCWA contracts with Larry Walker Associates for monitoring design, data compilation and reporting; and with Pacific Ecorisk for most field work. Three subwatershed groups conduct their own monitoring. Two of those (Pit River and Upper Feather) coordinate quarterly monitoring with the regional SWAMP monitoring.
- Monitoring cycles include
  - Two years of “core” constituents (total phosphorous, nitrates; E coli, management plans, and TMDLs. Clear Lake Nutrient TMDL and Delta chlorpyrifos/diazinon TMDL are currently the only applicable TMDLs with monitoring requirements. Much of this routine core monitoring does not generate useful information, so we are hoping to limit it to management plan constituents.
  - Every 3rd year “assessment/baseline” more extensive monitoring (core plus metals, pesticides, water column and sediment toxicity). The suites of contaminants are different in each subwatershed based on known water quality issues and pesticide use (e.g., the Source Evaluation Report prepared for nitrate exceedances in Ulatis Creek was reviewed with the city of Vacaville staff since the wastewater facility was likely the cause of the exceedances.
- Some management plan monitoring sites are remnants of UC Davis’ initial ILRP monitoring program.
- Many sites could be considered ambient receiving waters, but we monitor there because they are ag-dominated.

#### ***Why are you monitoring (what regulations and authorities require it)?***

- Irrigated Lands Regulatory Program (ILRP) under the Regional Water Quality Control Board.
- The ILRP will be regulated through a Waste Discharge Requirements “permit” next year under the Long Term ILRP adopted in 2011 by the Regional Board. This permit will replace and expand the current ILRP being implemented through the “Conditional Waiver”. SVWQC does not have a WDR yet under the new LT-ILRP.
- The new program (LT-ILRP and Coalition WDRs) will include groundwater quality. A Groundwater Quality Assessment Report that documents groundwater vulnerability (primarily for nitrate, but also pesticides and salts).

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- Save on cost by reducing sampling when you don't find exceedances. We will push for this in our WDR.

#### ***Where are your data stored and how are those data made available to others?***

- Stored internally in a database.

- Data provided quarterly to the Regional Board are available on their website.
- Our data are SWAMP comparable and should be uploaded to CEDEN.

***Do you coordinate your monitoring with others (and if so, how)?***

- Organized into 12 subwatersheds, each with their own management structure. Growers pay locally. RCDs are often the local points of contact for outreach/education.
- Upper Feather, Pit and Placer Nevada/So. Sutter/North Sacramento (PNSSNS) conduct their own monitoring in coordination w/NCWA (UFRW uses internal staff, NECWA hired Vestra, PNSSNS uses Hydrologics to do sampling).
- Info comes to NCWA for administration (legal, GIS, reports, monitoring, support to LWA for outreach, etc.) Admin costs are pro-rata (%). Claus has #s. NCWA and LWA do an annual budget. GIS done by LWA and others.
- Coordinate with the CA Rice Commission at sites in Sutter and Yolo Counties, which monitors separately for rice farmers.
- Coordination at the subwatershed scale means trusting another entity's ability to implement your requirements. If DWR's sites (regional SWAMP) are in the right places and are monitoring relevant constituents accurately, we may be able to coordinate better and reduce monitoring. But the constituents monitored for are different between waste water discharger and agriculture.
- Collaborating with others is most useful if the monitored constituents overlap. Cooperative sample collection can be useful if sites are in common and have been done a few times.

***How is your monitoring financed, and how stable is it?***

- Landowners pay on a per irrigated acre basis to their subwatershed groups. Each subwatershed group pays (1) the state for a "permit" fee and (2) NCWA for program management and implementation of LWA/Pacific Ecorisk monitoring program and LWA report writing.
- Fees are now approx. \$2/acre for:
  - 56 cents per acre for ILRP fees. The state received \$1.7 million in general funds from 2004 to 2011, during which time fees were only 16 cents per acre. Tam Doduc's proposed Resource Realignment and Cost Assessment effort may reduce state fees.
  - ~\$1/acre to NCWA. NCWA invoices subwatersheds twice per year.
  - ~50 cents to the subwatershed group manager.

***What types of assistance do you receive (or would you like to receive) to enhance your monitoring?***

- Comprehensive management documentation. The 2009 Monitoring and Reporting Program (MRP) allowed subwatersheds to document implementation of management practices instead of monitoring discharges. The MRP requires us to verify a certain percentage of those practices every year. The new WDR will require documentation of management practices to ensure the protection of high quality water.
- The Regional Board wants people to take it a step further by documenting management practices that are not under EQIP or AWEP o qualify for the Management Practice Reporting option.

***Can SRWP get copies of recent monitoring reports?***

- NCWA publishes quarterly and yearly summaries, which are available on NCWA's web site.

**Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- E. coli: A pathogen sources evaluation report in 2011 found 23 water bodies with E. coli (19 of which determined that ag was not a major source).
- Nitrates and salinity: 12 water bodies on the west side have salinity issues, but all are very minor and localized. Nitrate may be a localized groundwater issue in some areas, but it does not appear to be a widespread or major problem in the Sacramento Valley
- Pesticides and toxicity are of concern, but these are problems that we know how to address and manage. Bacteria, dissolved oxygen, pH, and salinity are all water quality issues that are only marginally or partially related to agricultural activities and are therefore problematic for agriculture to address independently.

***How are current monitoring activities helping to address these issues?***

- All of these issues are monitored under SVWQC's routine and management plan monitoring programs for the ILRP.
- NCWA participates in the Drinking Water Policy Workgroup, which may do a special study to address E. coli.
- NCWA participates in CV-SALTS, which is addressing nitrates and salinity. A current effort is to assess the applicability of the drinking water beneficial use (MUN) to ag drains.
- DWR's and USGS' continuous sensors (flow rate and some water quality measurements) are useful. We do use DWR's and USGS's flow and precipitation data for various short-term planning, longer-term assessment and source evaluation analysis, and occasional load estimation.

***Are there critical information gaps that prevent us from better addressing these issues?***

- Salinity is easy to monitor, but difficult to solve.
- Significant gaps with pathogens at several different levels and the use of E. coli as an indicator. Unclear how much ag influences or % attributable to natural causes (e.g., Pacific flyway). Even the basis for application of the standard to many water bodies is not clear. For example, should the REC-1 use apply to irrigation canals, or natural waters under flood or high runoff conditions, or to water bodies naturally high in E. coli due to wildlife use?
- TMDLs are developed through an imperfect process and often based on imperfect info/data, and consequently result in overly-simplistic implementations.

***What would you recommend to better address these issues?***

- 303(d) listing process needs to follow state listing policy. SRWP could use SWAMP data to do an objective, independent assessment.
- Improve methods and basis for determining pathogen exceedances, such as developing locally and seasonally appropriate limits. The same comment applies to DO and pH.

## **Regional Monitoring Questions**

*What other monitoring and assessment activities are most useful to you?*

- Continuous sensors

*How satisfied are you with the level of water quality monitoring in the watershed?*

- Somewhat, in that we are doing enough monitoring of ag discharges.

*How do you think monitoring in the Sacramento River Watershed could be improved?*

- DO and pH data may trigger a 303d listing in a stream that without ag runoff would be naturally dry. Could condition application of such standards on natural flow periods. Or just eliminate/reduce DO and pH monitoring requirements in such situations where the causes of low DO or extreme pH fluctuations are well understood.
- Our pilot program (in 3 subwatersheds) of self-monitoring and documenting (i.e., monitoring) implementation of management practices in areas with small areas of irrigated lands could be expanded.

*What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?*

- #1 is communication. The SRWP report cards are valuable. SRWP could be the hub of communication.
- #2 is coordination. SRWP could coordinate with other entities to give tours, as a docent for the valley. Todd Manley at NCWA would be our point of contact.
- #3 is assessment and reporting. The ILRP and SWAMP databases need to be inter-operable. ILRP and SWAMP CEDEN data requirements are different.

## **Wrap-Up**

*What would be possible incentives for you and others to participate in an RMP?*

- Incentives at the watershed scale would be some positive influence on regulations from a broad set of stakeholders and communication among those stakeholders.
- Subwatershed groups each have different monitoring needs and outreach methods. They can also obtain their own funds (e.g., BDCP or Prop 84 grants) for projects that are most appropriate for their members (and others in their subwatershed). RCDs can be more effective at obtaining funds than other (smaller) groups, and their ability to get outside funding might affect their ability/interest to participate in a RMP.
- Commodity groups (rice, almond) seem to prefer independent and self-directed monitoring, studies, and assessments.

*How would you suggest an RMP could be supported and organized?*

- No comment.

*Who may we be missing in our list of stakeholders?*

- Tess Dunham, who represents many farmers and groups in the valley

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- It appears that our new WDR (due December 2012) will include requirements for farmers to monitor groundwater. The new WDR may define monitoring areas based on groundwater vulnerability, etc.
- Monitoring should result in a plan to address real water quality problems. Need a path to a solution, not just more monitoring of the same known problems, known non-problems, and solved problems.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- We could, but it would have to be discussed with the subwatershed groups.

## **RMP Interview Q&A – Cathy Johnson and Kevin Aceituno (USFWS) by Stephen McCord (MEI) and Holly Jorgensen (SRWP), 21 March 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- The USFWS Environmental Contaminants Division (ECD) conducts investigations to identify contaminant issues and potential threats to listed species. These investigations provide information for other Division within the USFWS such as Refuges, endangered species, recovery and habitat conservation plans. The USFWS ECD in Sacramento Fish and Wildlife Office commonly monitors/investigates for pesticides, mercury and selenium.
- Recent watershed project is in the Cherokee Canal and Butte Sink Wildlife Management Area to Butte Creek. The sampling stations are at the Wild Goose Duck Club and Butte Sink NWR.
- Monitored field conditions with standard suite of sensors (pH, DO, temperature, conductivity), pesticides, and nutrients. Detect same fungicides as USGS.
- Focus mainly on current use pesticides and contaminants of emerging concern. Do not focus on legacy OCs, because current regulations do leave enough information for mitigation.
- Not monitoring Hg, but refuge managers are interested as they see potential requirements with future TMDLs.
- The USFWS ECD in Sacramento office's focus is Central Valley, Central California Coast, and Bay-Delta.
- Currently contract CDFW's water pollution lab at Nimbus Dam in Rancho Cordova for sample analysis. In the past we have also used a USFWS contract lab.
- The USFWS ECD deploys passive samplers to compliment grab samples. Semi-Permeable Membrane Devices (SPMD) are used to capture chemicals that are more hydrophobic. Polar Organic Chemical Integrative Samplers (POCIS) are used to capture more hydrophilic compounds. Samples can run \$800 - \$2,000. Although the SPMD and POCIS cannot detect a pulse or spike of chemical it gives a comprehensive assessment of what the aquatic organisms are exposed to over a period of ~30 days.

#### ***Why are you monitoring (what regulations and authorities require it)?***

I like Tom's response:

- Giant Garter Snake sensitive to water quality because USFWS can't completely drain their wetlands as others can to control weeds and drain away poor water quality.
- *Azola* (water fern) blooms with loss of water weevil beetle, potentially caused by adverse water quality conditions. Mats of *Azolla* kept migratory birds away.
- CERCLA-driven Natural Resource Damage Assessment in Cache Creek watershed.

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- Long-term programs – almost all USFWS monitoring is for a special study interest rather than baseline data to monitor trends.
- More continuous sensors
- Reliable, affordable labs

***Where are your data stored and how are those data made available to others?***

- Data for our studies is stored in the field office. The USFWS ECD tries to publish as many of our projects as possible.
- Not required to publish and funding is available for report writing which often will be in the form of a manuscript.
- No master database; hadn't heard of CEDEN.
- USFWS web site does not include most final reports.

***Do you coordinate your monitoring with others (and if so, how)?***

- Transparent with rice and ag coalitions as they typically share the same water with the Refuges.
- Try to partner our projects. Usually, with universities

***How is your monitoring financed and how stable is it?***

- The USFWS ECD has an internal funding program at a national level that targets on and off- refuge contaminant issues. These funds are annual and competitive.
- Funding from other programs of the USFWS such as Recovery and Endangered Species, Inventory and Monitoring and potentially Landscape Conservation Cooperative.
- External funding from Inter-agency Ecological Program, Bay-Delta Authority, Ecological Restoration Program, US Bureau of Reclamation.
- Change every year with federal budgets. Off-refuge funding not currently available.
- Rarely funds long-term monitoring.

***What types of assistance do you receive (or would you like to receive) to enhance your monitoring?***

- We would like consistent funding.

***Can SRWP get copies of recent monitoring reports?***

- Upon request

**Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- Conventional (temperature, DO)
- Metals & mercury
- Current use pesticides

***How are current monitoring activities helping to address these issues?***

- Conduct special studies to address refuge concerns.
- Focus on contaminants that address management actions and needs.

***Are there critical information gaps that prevent us from better addressing these issues?***

- EPA law suit for not setting conservative/protective enough criteria.
- Pesticide effects to red legged frog.
- Pesticide exposure and pathways and effects on listed species.

***What would you recommend to better address these issues?***

- Consistent funding
- Applicable studies

### **Regional Monitoring Questions**

***What other monitoring and assessment activities are most useful to you?***

- Being able to find reports and datasets.
- Anything that supports refuge managers.

***How satisfied are you with the level of water quality monitoring in the watershed?***

- Not satisfied. There needs to be consistent monitoring and the data more readily available.

***How do you think monitoring in the Sacramento River Watershed could be improved?***

- More and more consistent baseline data.
- Comparable data to compare with data in other regions' refuges.

***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- All of those. Need mechanisms and forums for communicating and coordinating with others.

### **Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- Listed species interests

***How would you suggest an RMP could be supported and organized?***

- Doing biological opinions for 7 pesticides

***Who may we be missing in our list of stakeholders?***

- Wetland refuge managers.
- NOAA (Joe Dylan in Santa Rosa) and other office in Sacramento—both are particularly interested in salmonids.

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- Clearly define the monitoring area.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- Cathy could facilitate.
- Has done for SF Bay and will for Delta RMPs.

## **For Regulators & Other Stakeholders**

### **Regulations, Policies, and Programs**

*What monitoring activities would be useful for regulatory programs (e.g., ILRP, TMDLs, NPDES permits)?*

- USFWS supports development and implementation of TMDLs.
- USFWS implements the federal Endangered Species Act.

*What related policy / regulatory programs and activities should this RMP development effort coordinate with?*

- Biological opinions.
- Litigation driven = pesticides and red legged frog.

*What regional monitoring efforts would be useful for other watershed-scale programs?*

- Coordinating with other experts re biological effects and flows.

### **Stakeholder Facilitation**

*What regulatory authority do you have (and could you use) to require, encourage, or allow participation in an RMP?*

- Endangered Species Act

*What are your interests in and concerns with doing so?*

- Can generally provide staff support.

### **Values and Contributions**

*What value would an RMP provide to your agency?*

- [not addressed]

*How could you help to fund an RMP?*

- Can help with proposals.
- Can provide in-kind support (and commit for proposals).

*How would your agency participate in an RMP (e.g., fund, in-kind, advise)?*

- We have a boat that could be deployed as in-kind support (not to loan out).

## **RMP Interview Q&A – Stephanie Fong (State and Federal Contractors Water Agency, or SFCWA) and Karen Gehrts (CA Department of Water Resources, or DWR), 1 April 2013**

### ***For Potential Partners***

#### **Your Monitoring**

##### ***What are your current monitoring activities?***

- SFCWA is not currently performing long-term monitoring. SFCWA's current studies are more research-oriented or are focused on improving monitoring or understanding data, than monitoring itself.
- IEP's Environmental Monitoring Program (available via CDEC) and the regional Surface Water Ambient Monitoring Program (available via CEDEN). Currently the EMP is monitoring water quality (discrete and continuous), benthos and phytoplankton.

##### ***Why are you monitoring (what regulations and authorities require it)?***

- DWR monitors according to Water Right Decision 1641.

##### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- I would like to do more shallow water sampling and more sampling in the northern Delta. This will allow for BDCP baseline monitoring.

##### ***Where are your data stored and how are those data made available to others?***

- SFCWA is working on improving this. Currently we have several SQL databases and data is available to the public via flat files on the web. The Central Valley Monitoring Directory is the most recent compilation of monitoring metadata for the Central Valley, but it lacks funding to keep it updated. Without centralized and comparable data, the monitoring performed lacks strength. Funding not only for monitoring, but for the reporting as well.
- DWR's data is stored in its Water Data Library.

##### ***Do you coordinate your monitoring with others (and if so, how)?***

- Yes, the EMP is an IEP program. I believe it's even paramount to coordination of monitoring itself. We should not monitor for monitoring's sake. We will get far more bang for the buck if the data that's currently collected actually gets used.

##### ***How is your monitoring financed, and how stable is it?***

- Very stable funding via state and federal water contractors.

##### ***What types of assistance do you (or would you like) receive to enhance your monitoring?***

- Resources for staff to improve analysis and data storage.

##### ***Can SRWP get copies of recent monitoring reports?***

- See our website (<http://www.sfcwa.org/category/programs/overview/>)

#### **Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- Contaminants, nutrients, and effects of habitat restoration.
- It appears that integrated monitoring is not sensitive enough to identify sources of impacts.

***How are current monitoring activities helping to address these issues?***

- The Delta RMP is trying to address these sorts of questions. Their monitoring will not be in place in the near future, but you should continue to follow their progress.

***Are there critical information gaps that prevent us from better addressing these issues?***

- There is little being done to address emerging contaminants and their effects. The registration process with Dept. of Pesticide Regulation and USEPA needs a more proactive approach. Monitoring for the wrong things for years remains a problem.
- There needs to be more source identification and use of more appropriate techniques. Today's environmental challenges are ever changing, and our tools for addressing them should also be. Data storage and management!

***What would you recommend to better address these issues?***

- There should really be a strong effort to make NPDES surface water (receiving water) data readily available to the public for analysis. This is one of the larger bodies of information that is not easily accessible to the public in a useful format.
- Development of more advanced techniques along with ground-truthing in real-world situations.
- More coordination and collaboration across fields of interest and expertise.
- If the data were collected comparably and stored in an easily accessible and useful manner, I would like to see more integrated monitoring that could address sources.

**Regional Monitoring Questions**

***What other monitoring and assessment activities are most useful to you?***

- Monitoring that would directly lead to management decisions like listing or delisting for the Water Boards (directly tying contaminant exposure to areas), monitoring that would inform.

***How satisfied are you with the level of water quality monitoring in the watershed?***

- We haven't seen any data recently.

***How do you think monitoring in the Sacramento River Watershed could be improved?***

- I was unaware that SRWP was doing any current monitoring, so perhaps the first thing is to let people know it's happening again. [NOTE: SRWP is not monitoring currently.]

***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- All of those mentioned, but particularly assessment and reporting.

**Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- To have a voice in the formation of an RMP and what questions it will address.

***How would you suggest an RMP could be supported and organized?***

- There are many models to choose from, but it will likely need to be tweaked for the stakeholders who end up coming to the table.

***Who may we be missing in our list of stakeholders?***

- I'm not sure who you've reached out to, so I suggest starting with the CV Monitoring Directory. NPDES-both WWTP and storm water (CIWQS database), and ILRP (CEDEN database) are the long-term data sets you might look into.
- Others performing specialized monitoring are DPR's Surface Water Program and USGS's NAWQA.

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- Sustainable funding will likely be your greatest challenge.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- An MOU would be up to our Board, and we have already entered into a much less formal agreement on the Delta RMP process.

***For Regulators & Other Stakeholders***

**Regulations, Policies, and Programs**

***What regional monitoring activities would be useful for regulatory programs (e.g., ILRP, TMDLs, NPDES permits)?***

- Monitoring that answers management questions and helps evaluate the effectiveness of management actions and control programs.

***What related policy / regulatory programs and activities should this RMP development effort coordinate with?***

- Most directly, you should coordinate with the Delta and San Joaquin RMPs.

***What monitoring efforts would be useful for other watershed-scale programs?***

- Larger scale requires integrative techniques like toxicity testing rather than monitoring of specific constituents, unless you plan to attack just one constituent on a large scale. Perhaps focus on habitat availability and the Biological Opinions.

**Stakeholder Facilitation**

***What regulatory authority do you have (and could you use) to require, encourage, or allow participation in an RMP?***

- SFCWA doesn't have regulatory authority. That really lies within the State and Regional Boards and USEPA.

***What are your interests in and concerns with doing so?***

- As with any stakeholder effort, there will be many voices, so keeping everyone on track to meet your goals will be your greatest challenge. Clear ground rules should be set early on, but you can't allow time for fully addressing every concern at the start if you want to get some deliverables taken care of.

**Values and Contributions**

***What value would an RMP provide to your agency?***

- Monitoring always provides additional information, but the greatest need is not additional monitoring—it's data accessibility, analysis, and reporting.
- Monitoring is great, and if you see something pop up, you need to be adaptive enough to develop a special study that can determine cause and effect.

***How could you help to fund an RMP?***

- SFCWA has a developing science program that seeks to answer management questions that agency staff need. We also have contracting ability that is less restrictive than State contracting allows. No, I do not have a separate funding stream and everything is tied to D1641.

***How would your agency participate in an RMP (e.g., fund, in-kind, advise)?***

- This would likely depend on the priorities you take on, but we have been playing a role in the Delta RMP that encompasses funding, steering, and technical help.

## **RMP Interview Q&A – Greg Golet (The Nature Conservancy, TNC) by Holly Jorgensen (SRWP) and Stephen McCord (MEI), May 14, 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- TNC monitoring is focused on horticulture restoration – planting native species in floodplains. We typically monitor 3 years to track plant survival.
- We are monitoring the health and vigor of valley elderberry for VELB habitat through PG&E mitigation funds.
- We collaborate with PRBO Conservation Science and Audubon Society for monitoring migratory land birds throughout Central Valley. At long-term and random sites, many associated with restoration sites.
- Research-based monitoring is associated with our conservation strategies, river dynamic, stakeholder concerns. These efforts are often with academic partners.
- We don't have a comprehensive monitoring program. TNC has integrated others' data to evaluate restoration effectiveness through TNC's Sacramento River Project partners.

#### ***Why are you monitoring (what regulations and authorities require it)?***

- Restoration projects have contractual obligations (e.g., VELB).
- No streambed alteration agreements because no earth moving.
- CEQA mitigation for some projects includes some monitoring.

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- While our focus is on ecological monitoring, water quality data would be a great compliment.

#### ***Where are your data stored and how are those data made available to others?***

- Reports and data files are archived at TNC and shared by request.
- Not uploaded anywhere.

#### ***Do you coordinate your monitoring with others (and if so, how)?***

- In general, TNC is interested in integrating other information to assess the status of terrestrial resources on the Sacramento River and report on effectiveness.
- Coordinate with Sacramento River National Wildlife Refuge related to restoration work, such as trial planting of forbes. We often partner with USFWS on research and conduct restoration work before transferring TNC-acquired properties to them to help them build their refuge system.
- Migratory Bird Partnership (TNC, PRBO, Audubon)
- Central Valley Joint Venture Working Group supports bird monitoring.
- Workshops on restoration involve tours, discussions, and presentations.
- Various levels within TNC share project level information regionally and beyond.
- Bank Swallow Technical Advisory Committee includes agencies, non-profits, and researchers. The group recently developed a conservation strategy (CS) that provides information on the swallow and its habitat needs that need to be considered in project

planning and implementation. The CS also provides recommendations for mitigation when impacts are unavoidable

- TNC participates in annual bank swallow survey along Sacramento River.
- Supports USFWS to count birds and mammals on wildlife surveys (4 per year) while boating down river.
- Support research by UC Santa Cruz to survey understory habitats for native plants and habitat value.

***How is your monitoring financed, and how stable is it?***

- Some grants we are awarded include/require monitoring.
- TNC funds internally from ag income on some restoration sites in Sac Valley.

***What types of assistance do you receive (or would you like to receive) to enhance your monitoring?***

- It would be useful to have broad coordination on development and implementation of a truly comprehensive monitoring plan for the health and status of the river.

***Can SRWP get copies of recent monitoring reports?***

- The Ecosystem Restoration Program funded the Sacramento River Monitoring and Assessment Project which synthesized available information to track implementation of restoration projects via an indicators framework. Focused on 36 quantitative ecological indicators (e.g., flow regime, terrestrial resources, aquatic habitat), conservation targets, ranked through thresholds comparisons. Greg led “An Ecological Scorecard for Sacramento River Terrestrial Flora, Fauna and Channel Dynamics” report; Fraser Shilling led Monitoring Plan (actually more like guidance) report. The Scorecard Reports on status of terrestrial resources and floodplain characteristics. It also evaluates progress towards the year 2000 CALFED ERP goals specific to the Sacramento River.
- The Sacramento River Project’s Scorecard Report is available.
- A manuscript on terrestrial and floodplain sites, status and progress towards meeting ERP goals will likely be published in late 2013. The indicators appendix would be particularly useful for an RMP. Greg is a lead author.

## **Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- Ag chemicals and nutrients that affect fisheries.
- Water quality is not an area that TNC has invested science capacity to address.

***How are current monitoring activities helping to address these issues?***

- Not sure.

***Are there critical information gaps that prevent us from better addressing these issues?***

- Nothing obvious.
- Sources of pollutants would be good to pinpoint.

***What would you recommend to better address these issues?***

- Better collaboration and linkages with aquatic resources (e.g., fisheries, aquatic food webs, floodplain dynamics)

- Link restoration projects (esp. levee setbacks, slough reconnections) to aquatic resources benefits.
- Finding sweet spot of project scale to actually proceed with projects without facing undue permitting and regulatory burdens.

### **Regional Monitoring Questions**

#### ***What other monitoring and assessment activities are most useful to you?***

- Interpreting links between water quality conditions (e.g., diazinon concentrations) and pathways/ effects on key aquatic taxa (e.g., salmon migration).
- Effects of on water quality in the river that result from restoration (conversion from farming to riparian buffers).

#### ***How satisfied are you with the level of water quality monitoring in the watershed?***

- Would like to know better who is monitoring what, where, when, how and why; how TNC could complement those efforts.
- In general program effectiveness has not been monitored sufficiently. Some ERP goals have had no progress (not sure about water quality goals), but no one is saying that or doing something to address that lack of progress.

#### ***How do you think monitoring in the Sacramento River Watershed could be improved?***

- Someone like SRWP needs to take the lead in water quality monitoring while remaining flexible to allow others to do what they do best and have funds to do.
- TNC can assist with and collaborate on ecological monitoring. We would like to see more collaboration with entities looking at aquatic system (i.e., fisheries).

#### ***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- All of those insofar as they would help TNC support others' efforts.

### **Wrap-Up**

#### ***What would be possible incentives for you and others to participate in an RMP?***

- Connecting TNC efforts with the larger ecosystem context.
- Knowing that efficiencies are being gained and collaborations improve efficiencies.

#### ***How would you suggest an RMP could be supported and organized?***

- Research component can be project/grant funded.

#### ***Who may we be missing in our list of stakeholders?***

- USFWS, CDFW (Mike Berry) at fish hatcheries, temperatures at salmonids.
- Jim Smith, Matt Brown, Bill Poytress at USFWS in Red Bluff monitor Battle Creek, Clear Creek, mainstem Sacramento River for salmonids, lampreys, sturgeon.
- See Sacramento River Project's Scorecard Report's appendix on indicators to see if some of the researchers listed might be appropriate to talk to based on their expertise.

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- Nothing else.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- Yes, but would need clear sense of obligations, benefits, etc.
- No relevant examples that I know of, although TNC has done lots of MOUs..

## **RMP Interview Q&A – Mike Berry (CA Dept. Fish & Wildlife) by Holly Jorgensen (SRWP), 31 July 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- Mike Berry with Region 1 covers Tehama, Shasta, Siskiyou and Lassen Counties. Regional 2 covers the counties south of Region 1: Butte, Colusa, Glenn, Placer, Plumas, Yolo, Sutter and Sacramento Counties.
- He supervises the team that does the monitoring for the Biological Opinion that we maintain 4 runs of salmon (spring, winter, fall and late fall)
- Carcass surveys. Modified Peterson. Monitor Cow, Cottonwood, Battle and Clear Creeks. Consists of a video station where salmon are crowded over a white plate w/a video overhead that counts them. USFWS and CDFW share equipment.
- Tape readers scan.
- Deer and Mill Creek have the same setup but are backed up w/Ditson – creates black and white image of fish. Also, we do summer dives on Deer Creek and walk in Mill Creek (water too turbid for diving). Creates long-term index verified by video. Sometimes do carcass on Deer and Mill but can't always do because they can't get access permission from landowners.

#### ***Why are you monitoring (what regulations and authorities require it)?***

- Most is for population estimates tied into fishing regulations (ceilings/floors) that determine whether and how intensively the fishing season can take place.
- Sometimes we monitor connected to a special study, such as stranding for fall runs. The issue is that the river drops when Bureau of Reclamation (BOR) starts filling up Shasta Lake and a percentage of the runs are dewatered. Use data to figure out how much water can be held back to fill up reservoir without affecting fall and winter run Chinook.

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- Would like to get more monitoring on tributaries.
- Need to monitor effects of marijuana cultivation.

#### ***Where are your data stored and how are those data made available to others?***

- Share data w/landowners.
- Population data are entered into Grand Tab. Stored in Red Bluff field office and summary reports often sent to Redding and Sacramento offices.

#### ***Do you coordinate your monitoring with others (and if so, how)?***

- Rely on USGS and DWR for flow and temperature data.
- Coordinate w/USFWS and DWR on certain aspects of field work.
- BOR pays for some monitoring.
- Subcontract Pacific Fishery Management Council staff to monitor.

#### ***How is your monitoring financed, and how stable is it?***

- Sport fish monitoring is financed by sporting good sales.

***Seasonal staff provided mainly by Bureau of Reclamation contracts. What types of assistance do you (or would you like) receive to enhance your monitoring?***

- Need assistance addressing marijuana cultivation issues.

***Can SRWP get copies of recent monitoring reports?***

- Reports summarizing our monitoring can be provided upon request.

**Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- Flow, temperature, and turbidity, especially after a fire (erosion and ash).
- Pesticides, herbicides, and fertilizers associated with illegal marijuana cultivation. Incentive to legalize marijuana and use tax funds to address pollution issues. Agencies are at a loss on how to address it.
- Urban runoff especially during first flush rain events. Redding and Red Bluff are the largest urban cities of concern.

***How are current monitoring activities helping to address these issues?***

- Currently have temperature control devices on Shasta and Whiskeytown reservoirs. Compliance points are set to measure temperature and ensure that water released from the dams is cool enough at a specific point for fish to spawn. Sometimes we can adaptively manage compliance points based on where fish are spawning.

***Are there critical information gaps that prevent us from better addressing these issues?***

- Questions regarding juvenile rearing habitat and how successful they are.
- Hundreds of unscreened diversions where juvenile fish are sucked in.
- Learned this year that straying of adults in the Colusa Basin is a huge issue.
- Other issues include predation and light pollution. Light can increase predation and slow or stop migration.

***What would you recommend to better address these issues?***

- Adding Ditsons and trapping would help address and determine how much straying occurs in the Colusa Basin.
- Reducing amount of light pollution from numerous bridges can significantly minimize issues. May be difficult due to safety issues.

**Regional Monitoring Questions**

***What other monitoring and assessment activities are most useful to you?***

***How satisfied are you with the level of water quality monitoring in the watershed?***

***How do you think monitoring in the Sacramento River Watershed could be improved?***

***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- We have several work teams and task forces that keep us informed and connected. We also work with the Golden State Salmon Association and other groups concerned with the status of salmonids. This has changed recently due to changes in management. The level of engagement is often due to personnel that are in charge and driving communication.

### **Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- I would participate if the information generated is useful and helps to keep me informed.

***How would you suggest an RMP could be supported and organized?***

- Talk to Tricia Bratcher.

***Who may we be missing in our list of stakeholders?***

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- Important to ensure that DWR's monitoring stations are funded.
- The agencies collect and contribute a lot of data and upload it to a database and make sure that the database is up to date, but they do a poor job of analyzing and reporting that information in a manner that makes sense and would be understood and relevant to decision makers and the public. That would be the major contribution that an RMP could make.
- Major need to take information that only exists in hard copies and scan and upload it into relevant databases.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

## **RMP Interview Q&A – Jim Smith (USFWS) by Holly Jorgensen (SRWP) and Stephen McCord (MEI); July 31, 2013**

### **Your Monitoring**

#### ***What are your current monitoring activities?***

- Working in region since 1978. Almost exclusively fish monitoring. Predominantly anadromous fish (salmon, steelhead, and more recently sturgeon) population monitoring and some habitat assessments.
- Area of responsibility includes mouth of Feather on Sac up to Keswick/Shasta dams.
- Primary activity is Chinook hatchery evaluation, including monitoring.
- Use video fish counting weirs and rotary screw traps.
- See Red Bluff web site for description of activities.
- CVPIA mandates Battle Creek and Clear Creek anadromous fish restoration, for which USFWS primarily conducts the monitoring.
- Also monitor in Cottonwood Creek and Bear Creek.
- Also conduct several special studies related to fish restoration projects.
- Has been conducting monitoring for juvenile salmonids at Red Bluff Diversion Dam since 1995.
- Also conducted annual juvenile larval green sturgeon surveys from 2008-2011.
- Install water temperature data loggers in key tributaries for periodic download (not real time), but rely on others for flow gages (fund DWR flow gages in Battle Creek).
- 

#### ***Why are you monitoring (what regulations and authorities require it)?***

- CVPIA requires monitoring for evaluation/effectiveness.
- Focused on effectiveness or adaptive management for anadromous fish hatcheries and associated fisheries.
- Policy requirements to monitor and evaluate Coleman and Livingston Stone hatcheries as FWS operated facilities.
- Adaptive management of Red Bluff Diversion Dam, but no longer operated (now pumped through fish screen).
- Monitoring required under the NMFS USBR Central Valley Project operations biological opinion (BO).
- Conducts some special studies with some funding from CalFed.

#### ***What aspects of your monitoring would you like to see changed or improved (and how)?***

- More stable funding with consistent objectives.
- Rely on others for flow monitoring, which is pretty stable on the mainstem by DWR and USGS.
- Temperature is other important factor. Sensors maintained by USBR are useful. Very little temperature monitoring downstream of Red Bluff (one new one at Wilkins Slough).
- Many tributaries lack both flow and temperature monitoring.
- Like to see adult green sturgeon monitoring continued.

***Where are your data stored and how are those data made available to others?***

- All summarized data in the form of reports posted on web site: [www.redbluff.fws.gov](http://www.redbluff.fws.gov)
- Juvenile salmonid passage estimates at Red Bluff Diversion dam data posted ~bi-weekly. Raw data stored on local network.
- Some monitoring data and reports from early 1990s and prior are available electronically. Some of it is stored in files with long term plans to scan and post.
- AFRP monitoring will fund start up monitoring activities and then will ask that another agency (e.g. DFW) take over and posts reports (reports on AFRP).

***Do you coordinate your monitoring with others (and if so, how)?***

- National Marine Fisheries Service consultations.
- CA Dept Fish and Wildlife coordination. Almost all fish monitoring in the watershed is by these two agencies.
- Participate in Upper Sacramento River Monitoring Project Work Team.
- Participate in Central Valley Salmonid Project Work Team to coordinate valley-wide.
- Other IEP work teams address individual fish species. Can find more info. on IEP website.

***How is your monitoring financed, and how stable is it?***

- Long-term, consistent monitoring has been funded via varying sources (and their variable objectives). Now USBR reimburses majority of monitoring expenses.

***What types of assistance do you receive (or would you like to receive) to enhance your monitoring?***

- More stable funding for consistent monitoring.
- Rely on other entities for fish related data including flow and temperature that is not always available. Data is fairly reliable above Red Bluff but little temp monitoring below RB. Would like to see more temperature monitoring between RB and Wilkins Slew. Below GCID is a “black hole” especially re: temperature data. Tributaries are lacking both flow and temperature monitoring. Need temperature data to determine fish movement, distribution, and mortality. Significant data gaps on the tributaries.

***Can SRWP get copies of recent monitoring reports?***

- Available online.

**Sacramento River Watershed Water Quality Issues**

***What are the major water quality issues of concern to you?***

- Uncertainty in effects of contaminants.

***How are current monitoring activities helping to address these issues?***

- Don't know about contaminants monitoring.

***Are there critical information gaps that prevent us from better addressing these issues?***

- Contaminant monitoring focuses on known contaminants but there are new chemicals that we don't know much about. Surveys are done with lethal amounts but would like to know the effects of smaller amounts. When flow and temperature conditions are good but fish counts are low, questions arise re: long term effects of NPS/contaminants including non lethal effects like fish movement and delayed mortality.

***What would you recommend to better address these issues?***

- No institutional framework to drive communication and coordination at broader Central Valley scale.
- New acoustical tagging method tested by UC Davis provided interesting information about migration patterns and survival. No agency has taken on responsibility for funding or maintaining monitoring stations and database. Hosting through NMFS Science program may be an option.
- Numerous funding sources, objectives, and responsible entities for fish monitoring make it difficult to establish dependable fisheries monitoring program.

**Regional Monitoring Questions**

***What other monitoring and assessment activities are most useful to you?***

- 

***How satisfied are you with the level of water quality monitoring in the watershed?***

- 

***How do you think monitoring in the Sacramento River Watershed could be improved?***

- Numerous funding sources and objectives make it difficult to establish an institution.

***What types of regional monitoring functions (e.g., communication, coordination, assessment and reporting) might benefit your monitoring activities?***

- Good local communication but could use more communication with those monitoring in adjacent watersheds and Delta. Need institutional framework to drive communication and the coordination of information.
- Improved accountability and consistency.
- Acoustical tagging was initiated and initially successful but the program has struggled due to lack of funding.
- Special studies are helpful but long-term consistent data is critical.

**Wrap-Up**

***What would be possible incentives for you and others to participate in an RMP?***

- Assurance that they are fully informed and aware of all monitoring activities in order to leverage resources and avoid duplication of efforts.
- Establishing monitoring requirements and assigning responsibility would improve the likelihood of stable funding to ensure long-term consistent monitoring.

***How would you suggest an RMP could be supported and organized?***

- Federal agencies need a strong authority to do work in area that may overlap state responsibilities, so having a state lead/umbrella could help facilitate USFWS involvement watershed-wide.

***Who may we be missing in our list of stakeholders?***

- Counterparts at CDFW (Mike Berry to be interviewed also on 7/31). Tricia Bratcher, HRC coordinator w/Brenda Olsen and Tricia Parker
- USFWS Region 2 (Butte Creek - Mike Healey) and (Chico - Tracy Nelson) and Rancho Cordova office - Joe Johnson (involved w/Colusa Drainage Basin fish stranding).
- UC Davis researchers Peter Moyle, Joe Cech, and Peter Klimley
- NMFS Southwest Science Center (Santa Cruz) – Sean Hayes, Salmon Ocean Ecology Team.

***Do you have additional suggestions or comments concerning water quality monitoring and the RMP?***

- Figure out how fish monitoring fits into an RMP primarily focused on water quality.

***Would you sign a Memorandum of Understanding to commit your organization to participate in an RMP? Do you have any examples of MOUs or similar instruments for committing resources to programs?***

- Regional Director would be responsible for making any decisions re: participation/an MOU.