CV-SALTS Technical Advisory Committee Meeting
8 March 2012

Agenda Item #4. Monitoring Plan to Evaluate MUN Beneficial Use in Agricultural Drains: Sacramento Valley Archetypes

Action Item: Written responses/recommendations from the TAC on the issues and questions presented.

The CV-SALTS initiative has identified the need to evaluate the protection of MUN beneficial uses in agriculturally dominated water bodies. CV-SALTS identified receiving waters of four POTWs (Cities of Willows, Colusa, Biggs and Live Oak) as potential archetypes for evaluating appropriateness of a MUN designation. These same potential archetypes have challenged the MUN designation during NPDES permit renewals.

A subgroup from CV-SALTS developed an initial draft workplan for the effort and identified that anticipated monitoring was the task which was the most time sensitive and should begin as soon as possible so that seasonal water quality information could be gathered while other efforts were conducted concurrently. A draft monitoring plan was prepared, circulated to the project workgroup and discussed at a meeting on February 22nd. Comments have been received on the draft monitoring plan from each of the POTWs, Sac Valley Coalition and California Rice Commission, CV-SALTS Working Group, CV Water Boards, State Water Boards, and US EPA staff. Key questions and issues identified in those comments are summarized here. The recommendations from the TAC will help staff finalize the monitoring plan.

Of note: the monitoring design includes a review every three months in order to allow adjustment based on parallel tasks in addition to water quality findings.

Questions and Issues

1. **Monitoring Questions** (Table 1 and pages 4-6 of draft Monitoring Plan and attached below)

- *Are we asking all the appropriate questions in our monitoring plan to evaluate the MUN beneficial use?*
- *Are we missing any key questions?*

The questions were developed from the viewpoint of evaluating MUN use in the POTW receiving waters which consist of a combination of ag drains and ag dominated water bodies. The study has not restricted its objective to "de-designation", rather attempts to design a program that would support: de-designation; refinement; site specific objectives; and/or selecting compliance points. The following policy guidance was referenced:

- 88-63: Sources of Drinking Water Policy
- 68-16: Maintaining High Quality of Waters in California
- 97-005: Policy Guidance for Direct Domestic Use of Extremely Impaired Sources
- 40 CFR131.10(g) Factors

2. Site Selection (see Table 2 in the Monitoring Plan)

When specific sites were evaluated by stakeholders, a number of separate issues and potential complicating factors were identified. Two broad areas of questions with some specific comment are listed below.

1. *Will the sites answer the question of MUN de-designation? Do they help with the broader issue of the appropriate beneficial uses of agricultural dominated water bodies or background for site specific objectives?*
    a. Should we be going further upstream to characterize the entire water body for segments like Powell Slough (City of Colusa)?
    b. Are we looking at water body segments or entire water bodies? Can a single site represent a full segment or do we look for "best" and "worst" cases?
2. *Do the monitoring sites adequately represent the water body? What kind of irrigation and recycling is going on in the area? Are there mixing zones?*
    a. Some of the sites may be too far downstream from the POTW with too many other influences (e.g., Butte Creek sites for the City of Biggs). How can we address the influences from other inflows like the Agricultural community?
    b. Should we be including sites from any named segment downstream of the POTW effluent outfall to the first non-MUN designated water body (e.g., each lateral drain from the City of Live Oak)?
    c. How do we address the fact that a segment of Powell Slough is now directly connected to the Colusa Basin Drain and allow for a recycling loop?

In order to help us answer some of these questions, staff has identified the following action steps:
- Site reconnaissance
- Initial Field surveys
- Meet with local irrigation districts for hydrological information

Does the committee have a recommendation on any sites that must be included in the study design?

3. Parameter Selection (see Appendix A in the Monitoring Plan)

Parameters were selected based on the Drinking Water Policy (flow and water body characteristics) and the Basin Plan regulations (MCLs and human health related CTR) with a special emphasis on the constituents that have reasonable potential to appear in the POTWs' effluents.

- What is the best way to measure flow in order to answer the exception in the Drinking Water Policy (sustained yield less than 200gpd)?
- Are the selected analytes appropriate to answer monitoring questions?
- Can some of the CTR monitoring be eliminated if previous studies indicate non-detect? (All four POTWs have CTR data in their receiving waters, but with the exception of City of Willows (data from 2007 – 2010) the information is incomplete and from 2002.)
- Can dioxin be eliminated if data from other studies indicate that it is not a concern for these water bodies?
- Can monitoring in the Colusa Basin Drain and Sutter Bypass be limited to analytes that reflect protection of the designated beneficial uses (e.g. MUN is NOT designated)?

4. Frequency Selection (see Table 4 in Monitoring Plan and attached below)

Flow and field measurements (EC, pH, temperature and dissolved oxygen) are scheduled for every other week at all sites. Key constituents identified as having reasonable potential to be discharged via the effluent are scheduled monthly at all sites. Full MCL and CTR analytes are scheduled for "seasonal" analysis (spring flows, irrigation season, dry season and storm runoff).

- Is the general tiered approach (every other week, monthly, seasonally) appropriate?
- Are other "seasons" more appropriate for the watershed and cropping pattern (dominated by rice and waterfowl habitat)?
    - Rice irrigation may include the following seasons:
        - Flooding of fields – late spring (April)
        - Dumping of water – late summer (August/September)
        - Duck Club flooding – fall (October)
        - Dry period – possibly short time in late fall/early winter (November/December)
    - For other type of crops, two main seasons are considered:
        - Storm season – mid November to February depending on the year
        - Irrigation season – late spring/early summer
- Are the frequencies appropriate for each site?
    - Should we add trigger points at certain sites (to continue or discontinue monitoring)?
- What is the appropriate monitoring timeframe (e.g. 12 months; 18 months; other)?

In order to help us answer the seasonal monitoring questions, staff has identified the following action steps:

- Water Board staff will further research cropping patterns, CDEC data for any available/representative stations, and other previously collected data (e.g. from local water agencies and ILRP data) to establish a better understanding of key "hydrologic seasons" in the POTW area.

5. Field Work for Monitoring

Water Board staff has committed to conducting the first 3-monthes of the monitoring effort and continues to work with stakeholders including POTW staff on leveraging opportunities. Depending on the flow measurement methodology recommended, additional resources may be needed.

6. Analytical Costs (see Tables 5 & 6 in the Monitoring Plan and attached below)

Anticipated analytical costs were generated utilizing current Central Valley Water Board contract prices and adjusting for analyses currently conducted by the POTWs. The final costs will be dependent on quarterly reviews; potential triggers to decrease analyte requests; and the amount of quality assurance (QA) required.

  - The Central Valley Water Board has allocated the following analytical funds to this effort:$20K between April and June 2012
  - $30 K available fiscal year July 2012 – June 2013

Additional questions remain.

- *Should we use 5% or 10% for QA?*
  - SWAMP requires 5%

- *Does the TAC recommend a minimum amount of CV-SALTS funding be made available to this project?*
  - *Contracting for services is anticipated to take a minimum of 3-months.*

Policy Issues

It is anticipated that the following questions will be discussed at the CV-SALTS Executive Committee policy sessions.

- What is the definition of "sustained" in the Drinking Water Policy exception?
- How should 200 gallons/day be interpreted?
- More information is needed on how the anti-degradation policy will apply and how the "baseline" levels are defined.

Monitoring Questions

Key Factors

- Is the designated use occurring? (Perform physical survey of the area)
- Is the water source predominantly recycled water, urban storm drainage, treated or untreated wastewater or agricultural return water? (California Department of Public Health policy memorandum 97-005: Recommends against the use of drinking water supplies from "Water that is predominantly recycled water, urban storm drainage, treated or untreated wastewater, or is agricultural return water"
- Is there a significant change in hydrology due to seasonality and/or water management?

88-63: Sources of Drinking Water

- Do the exceptions of the Drinking Water policy apply?
    - Does water source provide an average sustained yield of 200 gallons per day?
    - Is the water source in a system designed or modified to collect or treat municipal or industrial wastewaters, process waters, mining wastewaters, or storm water runoff?
    - Is the water source in a system designed or modified for the primary purpose of conveying or holding agricultural drainage waters?
    - Does the water body have a contamination, either by natural processes or by human activity that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices?
- If an exception is applicable, will the discharge (from the system designed to treat wastewater or conveying agricultural water) be monitored to assure compliance with all relevant water quality objectives as required by the Regional Boards?

68-16: Maintaining High Quality of Waters in California

- *Is the anti-degradation analysis for NPDES permit complete?*
    - *If not, what additional information is needed?*
- Is water quality sufficient to attaining the beneficial use? (What is the quality of the background water?)
    - If not:
        - At what point downstream is MUN achievable?
        - Do any of the 40CFR131.10(g) Factors occur?
            - Naturally occurring pollutant concentrations prevent attainment of use
            - Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent

discharges without violating State water conservation requirements to enable uses to be met

- Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place
- Dams, diversions or other types of hydrologic modification preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use
- Controls more stringent than those required by sections 301 (b) and 306 of the Act would result in substantial and widespread economic and social impact

What are the appropriate constituents to monitor?

Table 1. Summary of Methods Used to Evaluate MUN Beneficial Use

	Method of Evaluation						
		Site Selection			Parameter Selection		
Monitoring Questions	Background Survey Watershed (Includes looking for intake pipes and interviews with POTWs and Irrigation Districts)	Monitor at Upstream Receiving Water Sites	Monitor at Downstream Receiving Water Sites	Monitor at Effluent Sites	Monitor Flow	Monitor MUN Constituents listed in: MCLs, CTR, Public Health Goal, Notification Level for drinking water, Odor Threshold	
Key Factors							
Is the MUN use occurring?	X						
What is the characterization of the water source?	X						
Is there a change in Hydrology?	X	X	X		X		
88-63: Sources of Drinking Water Policy							
Does the water source provide an average sustained yield of 200 gallons per day?	X	X	X	X	X		
Is the water source in a system designed to treat industrial wastewaters?	X						
Is the water source in a system modified for the primary purpose of holding or conveying agricultural drainage waters?	X						
If an exception is applicable, will the discharge be monitored to assure compliance with all relevant water quality objectives as required by the Regional Boards?			X			X	
68-16: Antidegradation Policy							
Is the Antidegradation analysis complete for NPDES permit?		X	X	X		X	
Is water quality sufficient to attaining MUN?		X	X	X		X	
If not, at what point downstream is MUN achievable?			X	X	X	X	
Do any of the 40CFR131.10(G) Factors occur?	X	X	X	X	X	X	
What are the appropriate constituents to monitor?					X	X	

Table 1. Sampling Frequency (W= Weekly, M=Monthly, S=Seasonally)

Location	Sites	Flow and Field Parameters	Key Constituents of Concern	Inorganic Chemical Scan	Non-volatile Synthetic Organic Chemical Scan
City of Colusa	**Unnamed tributary to Powell Slough**, below the first upstream agricultural discharge (up to 50 feet upstream)	W	M	S	S
	Unnamed tributary to Powell Slough, above the first downstream agricultural discharge (up to 200 feet downstream)	W	M	S	S
	Powell Slough, 250 feet **upstream** from the confluence of the unnamed tributary to Powell Slough with Powell Slough)	W	M	S	S
	Powell Slough, 400 feet **downstream** from the confluence of the unnamed tributary to Powell Slough with Powell Slough)	W	M	S	S
	Powell Slough, Last point before Powell Slough flows into the Colusa Basin Drain	W	M	S	S
	Colusa Basin Drain, **upstream** of effluent discharge	W	M	S	S
	Colusa Basin Drain, downstream of effluent discharge	W	M	S	S
	Effluent Pump Station	W	M	S	S
City of Willows	**Upstream** Receiving Water – 1500 feet upstream from D-001 when discharging to **Ag Drain C**	W	M	S	S
	Downstream Receiving Water – 100 feet downstream from D-001 when discharging to **Ag Drain C**	W	M	S	S
	Upstream Receiving Water – 100 feet upstream from D-002 when discharging to **GCID Lateral 26-2**	W	M	S	S
	Downstream Receiving Water – 100 feet downstream from D-002 when discharging to **GCID Lateral 26-2**	W	M	S	S
	Logan Creek – **Upstream**, This site is the next water body that receives flow from Ag Drain C or GCID Lateral 26-2	W	M	S	S
	Logan Creek – **Downstream**, last point before Logan Creek flows into the Colusa Basin Drain	W	M	S	S
	Colusa Basin Drain, **upstream** of effluent discharge from Willows	W	M	S	S

Location	Sites	Flow and Field Parameters	Key Constituents of Concern	Inorganic Chemical Scan	Non-volatile Synthetic Organic Chemical Scan
	Colusa Basin Drain, **downstream** of effluent discharge from Willows	W	M	S	S
	Effluent - Downstream of the last connection through which wastes can be admitted to the outfall	W	M	S	S
City of Live Oak	Approximately 50 feet **upstream** of Discharge Point No. 001 to the receiving water. **Reclamation District 777 Lateral Drain No. 1 or 2**	W	M	S	S
	Approximately 200 feet **downstream** of Discharge Point No. 001 to the receiving water or upstream of the next ag drain. **Reclamation District 777 Lateral Drain No. 1 or 2**	W	M	S	S
	Effluent 1- Location where a representative sample of the facility's effluent can be obtained prior to discharge into the receiving water	W	M	S	S
	Effluent 2 - Location where a representative sample of the facility's effluent pH and turbidity can be obtained downstream of the facility's tertiary filters and upstream of the UV disinfection system. Note: New Tertiary facility only	W	M	S	S
	Wadsworth Canal, Last point before effluent discharge from treatment plant flows into the Sutter Bypass	W	M	S	S
	Upstream of effluent discharge from Live Oak, In **Sutter Bypass**	W	M	S	S
	Downstream of effluent discharge from Live Oak, in **Sutter Bypass**	W	M	S	S
City of Biggs	**Lateral K – Upstream** receiving water sample – 100 feet upstream of Discharge Point D-001	W	M	S	S
	Lateral K – Downstream receiving water sample – 100 feet downstream of Discharge Point D-001	W	M	S	S
	Effluent sample point – last connection through which wastes can be admitted into the outfall	W	M	S	S
	Upstream of effluent discharge from Biggs, In **Butte Creek**	W	M	S	S
	Downstream of effluent discharge from Biggs, in **Butte Creek**	W	M	S	S

Table 2. Laboratory Costs for Key Constituents and All Scans

Constituent	Test Method	Cost
Key Constituents (Monthly sampling)		
Boron	200.8	$ 5.00
Sodium	200.8	$ 5.00
Nitrate	300	$ 7.00
Arsenic	1639	$ 8.00
Volatile Organic Compound & Oxygenated Additive Scan (This scan includes Total Trihalomethanes)	8260B	$ 60.00
Aluminum	200.8	$ 5.00
Iron	200.8	$ 5.00
Manganese	200.8	$ 5.00
MBAs	5540C	$ 20.00
Total per Site:		$ 120.00
Total per Month (28 Sites):		$ 3,360.00
QA Samples per Month (10%):		$ 336.00
Total per Month (28 Sites + QA):		$ 3,696.00
Total for 28 Sites for 18 months:		$ 66,528.00
Inorganic Chemical Scan (Seasonal sampling - Once every 3 months) *Note: Asbestos Cost is being determined because it was not part of the Lab Contract*		
Antimony, Barium, Beryllium, Cadmium, Chromium, Nickel, Thallium, Copper, Silver, Zinc	200.8	$ 50.00
Lead	1638	$ 35.00
Total Dissolved Solids	2540C	$ 7.00
Ammonia	4500-NH3	$ 25.00
Nitrite	300	$ 7.00
Chloride	300	$ 7.00
Sulfate	300	$ 10.00
Cyanide	335.4	$ 22.00
Fluoride	300	$ 10.00
Mercury	1669/1631	$ 100.00
Perchlorate	314.1	$ 50.00
Selenium	200.9/1639	$ 8.00
Total per Site:		$ 331.00
Total per Season (28 Sites):		$ 9,268.00
QA Samples per Season (10%):		$ 926.80
Total per Season (28 Sites + QA):		$ 10,194.80
Total for 6 seasons:		$ 61,168.80
Organic (Non-Volatile Synthetic Organic Chemicals) Chemical Scan (Seasonal sampling - Once every 3 months) *Note: Bentazon, Diquat, Endothall, Glyphosate, Molinate, and Thiobencarb Costs are being determined because they were not part of the Lab Contract*		
Organo-Chlorinated Pesticide	8081A	$ 60.00
Gas Chromatography/Mass Spectrometer (GC/MS) Semivolatiles	8270C	$ 95.00
Chlorinated Herbicide	8151A	$ 60.00
Organo-Phosphorus Pesticide	8141A	$ 60.00
Polychlorinated Biphenyls (PCB's)	8082A	$ 60.00
Poly-Chlorinated-Dibenzo-p-Dioxin/Furan High Resolution Mass Spectrometer (HRMS)	8290	$ 500.00
Carbamate Pesticide	8318	$ 125.00
Total per Site:		$ 960.00
Total per Season (28 Sites):		$ 26,880.00
QA Samples per Month (10%):		$ 2,688.00
Total per Season (28 Sites + QA):		$ 29,568.00
Total for 6 seasons:		$ 177,408.00
Grand Total for Key Constituents and All Scans:		$ 305,104.80

Table 3. Estimated Analytical Cost by POTW Study Area**

POTW	# Sites	Estimated Analytical Cost**			
		Each Month	Each Season	1-Year	18-Months
Willows	9	$1,181	$12,734.90	$65,164	$97,793
Colusa	8	$961	$11,005.80	$56,668	$85,043
Live Oak	6	$714	$8,201.60	$42,650	$63,466
Biggs	5	$653	$7,054.50	$34,687	$54,207
Total:	28	$3,509	$38,996.80	$199,169.00	$300,509.00

Monthly = $132/site (Includes 10% for QA)
Seasonal = $1420.10/site (Includes 10% for QA)
1-year = 12-monthly + 4-seasonal
18-months = 18-monthly + 6-seasonal
**Costs Based on Central Valley Water Board FY11/12 Analytical Contract
**When applicable, costs have been adjusted when POTW is monitoring the same constituent as part of their NPDES permit