

Regional Watershed Monitoring Program – Proposal for 2014 Sampling December 9, 2013

Summary of Recommendations

- Suspend probabilistic sampling of new sites for 2014 only
- Devote approximately 50% of sampling effort to revisiting sites sampled in 2009 to begin trend detection. These sites should include a range of different biological conditions (high, medium, and low).
- Devote approximately 50% of sampling effort to evaluating assessment tools at non-perennial reference sites
- Use results of the 2014 sampling to inform decisions regarding design for 2015-2019 regional monitoring efforts.

Introduction and Background

2013 was the final year of the first five-year cycle of the SMC regional monitoring program. Because of the time necessary to complete sampling and data analysis, the final report for the first five-year cycle will not be completed until early 2015. Design of the next five-year monitoring program (2015-2019) should take advantage of the results and conclusions from the first five years of monitoring. To accommodate the one year lag time in producing the final report, the SMC Executive Committee and the SMC Bioassessment Workgroup agreed to suspend normal probabilistic sampling of new sites in 2014 and instead pursue two research projects that support portions of the SMC research plan: trend detection and bioassessment in nonperennial streams. By redirecting resources towards these two projects, the SMC hopes to generate useful data that will not only provide some answers for key management questions, but also provide guidance for designing the next 5-year cycle of the stream bioassessment survey. These two “pilot projects” should be cost-neutral and effort should be shared among SMC partners.

Summary of Proposed 2014 Research Projects

The proposed pilot projects are aimed at providing initial data necessary to address the selected questions and to provide information that will help inform design decisions for sampling in 2015-2019 workplan. In neither case will the one year of sampling in 2014 be able to fully answer the questions posed by the pilot projects.

Detecting change in condition over time.

Objective: Determine if stream condition has changed over time since the inception of the regional monitoring program.

Rationale: Detecting changes in regional condition has been a key management question from the start of this program. However, the design that was implemented for the first five years emphasized

obtaining precise estimates of ambient condition rather than estimates of change; consequently, site revisits were not conducted during the past five years. Site revisits allow the estimation of trends and reduces confounding factors that would occur simply by comparing condition estimates among years. *Approach:* Participating agencies will revisit probabilistic sites sampled early in the program (preferably in 2009 or earlier). Changes measured at each site will be used to estimate regional trends. Approximately 30 sites will be sampled, allowing for a reasonably precise estimate of regional change in condition since 2009. Site selection will emphasize capturing a range of conditions. Fully lined channels (sides and bottom, which are presumed to have experienced no change in condition) will be excluded from this study.

Indicators and analytes: The full set of analytes used in the current program will be sampled:

Indicator type	Analyte
Biological	Benthic macroinvertebrates Benthic algae (taxonomic assemblages, ash-free dry mass, and chlorophyll a)
Habitat	SWAMP PHAB protocol (full) CRAM
Toxicity	Ceriodaphnia water-phase test, with a Hyalella water-phase test substitute in water with specific conductance ≥ 2500 uS/cm
Water chemistry	Nutrients (Orthophosphate-P, Total P, Ammonia-N, Nitrate-N, Nitrite-N, Total N) Conventional water chemistry (Hardness as CaCO ₃ , total suspended solids, chloride, silica, sulfate) Total and Dissolved Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Zinc) Pyrethroids (Bifenthrin, Cyfluthrin, Chalothrin lambda, Cypermethrin, Deltamethrin, Esfenvalerate, Fenvalerate, Permethrin-1, Permethrin-2)

Site selection: Sites (and back-up sites) will be identified for sampling by SCCWRP, in consultation with participating agencies. Site selection will adhere as close as possible to the following criteria:

1. Sites that were successfully sampled in 2009 will be selected for revisiting. Sites sampled in subsequent years may be used as back-ups. (Successful sampling means that at least 500 benthic macroinvertebrates were collected; criteria for other indicators may also be considered).
2. Streams with artificially hardened streambeds will be excluded.
3. Site selection will be stratified by jurisdictional/permit requirements, watershed, and initial condition (determined by CSCI score or by land use).
4. Other constraints and concerns will be addressed on a case-by-case basis.

Schedule: A list of sites and backups will be generated SCCWRP by January 31, 2014. Training and intercalibration events (if desired by participants) will occur in March 2014. Sampling will occur during the normal index period (generally between May 15 and July 15, but never within 4 weeks of a scouring event).

Expected outcomes: This project will allow an estimation of change in condition since 2009 and provide insight into the sensitivity of this approach to detect change. Because samples will be from revisited, probabilistically-selected sites, we will be able to estimate interannual variability in ambient condition, without confounding the results with site-specific factors.

Validating and refining assessment tools for use in nonperennial streams

Objective: Determine whether existing assessment tools (e.g., CSCI and the SoCal algae IBIs) apply for assessment of intermittent streams, and/or what modifications are necessary for use in these systems.

Rationale: Although the majority of stream length in southern California consists of nonperennial streams, existing assessment tools have only been validated extensively with perennial streams. The SMC will add to a growing network of nonperennial reference sites that can be used to validate or calibrate existing assessment tools for use in nonperennial streams.

Approach: Participating agencies will sample known or likely reference nonperennial sites. Where possible, sites will be revisited two or three times, three to six weeks apart. The primary focus of this study is to expand the spatial coverage of the nonperennial reference network, identifying types of streams where existing assessment tools do or do not work well. A secondary focus is to identify seasonal effects on the validity of assessment tools; to accomplish this goal, sites will be revisited two or three times over the course of the summer, if possible.

Indicators and analytes: A subset of the SMC's normal indicators will be measured at nonperennial reference sites, including benthic macroinvertebrates, benthic algae, habitat, and limited water quality. Because fewer indicators are measured, resources may be directed towards the deployment of continuous water level loggers at certain sites.

Indicator type	Every visit	Once per site
Biological indicators	Benthic macroinvertebrates Benthic algae (taxonomy, ash-free dry mass, chlorophyll a)	
Habitat and hydrology	PHAB components: Ambient water quality Discharge Wetted width Pebble counts and associated measurements Instream habitat cover Riparian vegetation Flow habitats (i.e., drop bank dimensions, bank stability, survey, human influence from revisits)	CRAM PHAB (full) One continuous water level logger per site

Water chemistry	Nutrients (Orthophosphate-P, Total P, Ammonia-N, Nitrate-N, Nitrite-N, Total N) Other analytes are optional	
Toxicity	Optional	

Site selection: Candidate nonperennial reference sites will be identified by participating agencies, in consultation with SCCWRP. This list of candidate sites (plus at least one backup per site) will be finalized by January 31, 2014.

Site selection will adhere as close as possible to the following criteria:

1. Streams will meet (or suspected to meet) all reference criteria used for the development of bio-objectives. Particular attention should be paid to avoid hydrologic disturbance, such as groundwater pumping or discharges from stock ponds, as these have been shown to have a large impact on biological integrity.
2. Streams should be intermittent, with flow expected to last at least through March and cease by November in the upcoming year.

Other constraints and concerns for site selection will be addressed on a case-by-case basis.

Schedule: A list of sites and backups will be generated SCCWRP by January 31, 2014. Training/intercalibration events (if desired by participants) will occur in March 2014. Sampling may begin as early as March 2014, but under no circumstances should streams with evidence of recent scour be sampled.

More sites vs. more visits at fewer sites: Our reference network can benefit from both spatial and temporal replication of reference nonperennial streams. We shall try to revisit each site.

Sampling contingencies: This project in particular requires contingency planning, as stream flow may be lower than expected during the sampling season. We shall get as close to our intended sampling design as possible (that is, each site sampled two or three times), but with the awareness we may need to adjust our sampling plan as follows:

1. If an intended revisit at one site is not possible, an additional revisit may be collected at another site.
2. Alternatively, the "revisit" may be moved to a backup reference nonperennial site.
3. If a backup reference nonperennial site cannot be sampled, sampling effort may be re-allocated from the nonperennial project to the trend detection project. That is, an additional site from 2009 will be revisited when a nonperennial reference site cannot be sampled.

Other contingencies and backups may be selected on a case-by-case basis. Under no circumstances shall a clearly nonreference nonperennial stream be used as a backup for this study.

Expected outcomes: This project will add between 10 and 30 sites to the nonperennial reference network, allowing preliminary validation of assessment indices, such as the CSCI and the SoCal algae IBIs. By combining data with similar efforts, we may begin to determine if validity is limited to certain nonperennial stream types or index periods.

Cost and Schedule

The two proposed research projects will be cost-neutral (i.e. the same amount of funds will be expended in 2014 as is expended in other years). An approximate distribution of sampling effort is shown in the table below:

Proposed Distribution of Sampling Effort for 2014

Agency	Trend detection samples	Nonperennial samples	Total
Ventura County	8	7 (3-4 sites)	15
LA County	3	4 (2-4 sites)	12
LARWMP	3	3 (1-3 sites)	6
SGRRMP	3	3 (1-3 sites)	6
Orange County	4	4 (2-4 sites)	8
San Bernardino County	2	2 (1-2 sites)	4
Riverside County	3	3 (1-3 sites)	6
San Diego County	8	8 (4-6 sites)	16
TOTAL	34	34 (10-30 sites)	68

Participation from SWAMP and regional boards TBD.

Point of Contact: Raphael Mazor, raphaelm@sccwrp.org