

**STATE OF CALIFORNIA  
REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL COAST REGION**

**STAFF REPORT FOR REGULAR MEETING OF JULY 6, 2007**  
Prepared on June 12, 2007

**ITEM NUMBER: 11**

**SUBJECT: Central Coast Ambient Monitoring Program Update**

**SUMMARY**

The Central Coast Ambient Monitoring Program (CCAMP) staff conducts regional monitoring for the Central Coast Water Board in coordination with the State Board's Surface Water Ambient Monitoring Program (SWAMP). This year will mark the tenth year of CCAMP monitoring and assessment in the Central Coast Region and the seventh year of coordinated implementation with SWAMP.

CCAMP's annual work plan includes a detailed description of CCAMP monitoring efforts that will be implemented in Region 3 over the next five years. Staff has completed writing draft watershed assessment reports for most Hydrologic Units in the Region. Staff is currently revising these reports following peer review, and the draft reports are available on the CCAMP website (<http://www.ccamp.org/ccamp/Reports.html>).

This status report will serve as a brief update to Water Board members on CCAMP program status, general monitoring and assessment design and CCAMP coordination with other Water Board staff and other agencies and organizations in the Region.

**DISCUSSION**

CCAMP staff monitor and assess all major waterbodies in the Region using two monitoring strategies: 1) coastal confluences monitoring and 2) watershed rotation area monitoring.

CCAMP staff initiated monthly coastal confluence monitoring in April 2001 at thirty-three sites. Staff selects coastal confluence sites based on watershed size and/or known water quality concerns in the watershed. Staff identifies sampling site locations on the lowest reach of the creek or river but above the coastal lagoon and tidal influence whenever possible. Monthly conventional water quality is ongoing at these sites (Attachment 1).

Staff monitored continuously with the exception of calendar year 2003. Staff discontinued monitoring in April 2003 and did not resume until January 2004 due to SWAMP budget cuts.

CCAMP staff initiated watershed rotation area monitoring in 1998. Each year, CCAMP staff conducts monthly monitoring at approximately thirty sites within a watershed rotation area. Over a five-year period, staff monitors and evaluates all of the Hydrologic Units in the Region. This design incorporates all Hydrologic Units in the Region into one of the five rotation areas (Attachment 1).

For each of the watershed rotation areas, CCAMP employs a tributary-based approach to characterize all major waterbodies in the Region, as well as larger tributary inputs to those waterbodies. Staff selected long-term monitoring sites at major tributary inputs and at the mainstem upstream of each tributary input. Staff also selects monitoring sites at other locations of interest in

the watershed (such as above and below specific land uses, point sources, best management practices, or other areas in need of characterization).

CCAMP staff completed one five year rotation in 2002. Staff did not conduct watershed rotation area monitoring in 2003 due to SWAMP budget cuts. In 2004, staff used SWAMP funds to characterize the chemical and biological status of each of the Region's harbors (the final report is currently being peer reviewed). Staff resumed watershed rotation area monitoring in the Pajaro and Big Basin Hydrologic Units in 2005, Salinas Valley in 2006, and in the Santa Maria watershed in the current year.

The CCAMP strategy of establishing and maintaining permanent long term monitoring sites provides a framework for trend analysis and detection of emergent water quality problems and maintenance of high quality waters. CCAMP summary data and assessment reports are available on our website (<http://www.ccamp.org/>).

### **Monitoring Approaches**

CCAMP uses a variety of monitoring approaches to characterize status and trends at monitoring sites. The CCAMP staff conduct monthly monitoring for conventional water quality and flow at all sites. Staff applies other monitoring approaches at a subset of sites, including assessing toxicity, benthic macro-invertebrates and physical habitat conditions. Detailed descriptions of these methods and references to the associated standard operating procedures follow.

### **Conventional Water Quality**

Staff monitors basic conventional pollutants monthly at all coastal confluence and watershed rotation sites following the CCAMP standard operating procedures and SWAMP quality assurance guidelines. CCAMP has established 184 long term monitoring sites (this includes coastal confluence and watershed rotation area sites).

At each site, CCAMP staff collects in-stream measurements and grab samples to be analyzed by the Central Coast Water Board's contract laboratory.

For in-stream measurements, staff use a Hydrolab® multi-analyte probe to measure dissolved oxygen, pH, water temperature, turbidity, conductivity, salinity and chlorophyll *a*. All probes are calibrated following the manufacturer's procedure prior to and following each sampling event.

Staff collects grab samples at each site to be analyzed by the Central Coast Water Board's contract laboratory. Samples are collected at each site following the SWAMP standard operating and quality assurance procedures. Quality assurance procedures at the laboratory follow USEPA approved methods. Samples are analyzed for nutrients, coliforms, *E. coli*, dissolved and suspended solids and mineral salts.

### **Flow**

In addition to in-stream water quality measurements staff measure flow using a top setting rod and pygmy bucket wheel at all sites where United States Geological Survey (USGS) gauges are not available. Staff establish a transect to conduct flow monitoring perpendicular to the direction of flow and make a minimum of ten flow measurements at even intervals across the transect.

### **Toxicity**

Each year, CCAMP staff conducts toxicity monitoring at a subset of CCAMP sites, depending on available funding. Staff typically conducts three toxicity monitoring assessments at each site; staff collects water toxicity samples in both wet and dry season flow conditions and a single sediment toxicity sample in spring. Water samples are tested for toxicity to three test species, an invertebrate (generally *Ceriodaphnia dubia*) a larval fish (generally *Pimephales promelas*) and an alga (generally

*Selenastrun* sp.). If salinity of sample water exceeds each species tolerance level, a substitute species is used. Sediment samples are tested for toxicity to *Hyalella azteca*, an invertebrate tolerant to a wide range of salinity conditions. Sample collection is conducted by CCAMP staff following SWAMP standard operating procedures. All sample analyses are conducted at the SWAMP or Central Coast Water Board contract laboratory. Since 2000, CCAMP staff has collected toxicity data at seventy sites throughout the Region.

### **Benthic Macro-invertebrate and Physical Habitat**

Each spring, CCAMP staff conducts benthic macro-invertebrate assessments at a subset of the CCAMP sites following SWAMP Bioassessment Procedures. Staff typically conducts Benthic macro-invertebrates assessments in two consecutive spring seasons at each site. Based on available funding, staff determines the number of sites to be monitored. All benthic macro-invertebrate samples are processed and identified to the lowest possible taxon at the California Department of Fish and Game Aquatic Bioassessment Laboratory. Since 1998, CCAMP has collected benthic macro-invertebrate data at ninety sites in the Region.

### **Coordination with Other Water Board Programs**

#### **Measuring our Goals**

The Central Coast Water Board's goals for the vision, healthy, functioning watersheds, includes the goal: "By 2025 80% of Aquatic Habitat is healthy; and the remaining 20% exhibits positive trends in key parameters." CCAMP will serve as a primary data provider to the Vision Assessment Team to measure this and the other goals. This team is currently developing several multi-parameter indices that will be used as a measure of health. For example, for aquatic habitat health, staff will use data associated with measures of biostimulation, benthic macro-invertebrates, and toxicity. CCAMP's Biostimulatory Risk Index combines multiple indicators of nutrient enrichment (nutrient concentrations, dissolved oxygen and pH variability, water column and benthic algae) into a single score. The CCAMP Index of Biotic Integrity uses benthic macro-invertebrate community taxa and includes multiple measures of diversity, tolerance, and community structure. Toxicity data measure the survival of test organisms exposed to water and sediment samples.

These measures will also support assessments for the Update of the Clean Water Act Section 303(d) List of Water Quality Limited Segments (Impaired Waters List), Update of the Clean Water Act Section 305(b) Water Quality Assessment and CCAMP Hydrologic Unit assessment reports. Although the Central Coast Water Board's Basin Plan identifies several numeric criteria that are specific to beneficial uses, there are many narrative objectives in the Basin Plan that require development of metrics to interpret.

#### **Staff Coordination**

CCAMP staff is coordinating with other Water Board program staff including the Total Maximum Daily Load (TMDL), Stormwater, and Irrigated Agricultural Waiver (Ag Waiver) Programs, to ensure consistency with SWAMP in data gathering methods, data quality objectives, and data reporting formats. In addition, CCAMP has developed web-based templates for data delivery to be used by the Cooperative Monitoring Program associated with the Ag Regulatory Program (the Ag Monitoring Program), grant projects and other data collection entities. These templates ensure data is delivered in SWAMP comparable format.

CCAMP coordinates with monitoring activities of the Ag Monitoring Program. The Ag Monitoring Program conducts monthly conventional monitoring for a subset of the CCAMP analyte list (probe measurements, nutrients and dissolved solids), spring benthic macro-invertebrate collection and water and sediment toxicity monitoring during both wet and dry seasons at all sites. Several CCAMP sites are co-located with Ag Monitoring Program sites; CCAMP samples these sites for

conventional water quality to ensure that the full complement of CCAMP parameters is collected but relies on Ag Monitoring for toxicity and benthic macro-invertebrate data.

CCAMP data is also heavily used by permit staff, enforcement staff, and TMDL staff. The CCAMP program addresses a wide variety of water quality parameters and beneficial use questions with the intent of providing information to inform further action by agency staff. The following are examples using recent CCAMP data collected in the Salinas and Santa Maria Watersheds.

### **Water Quality Decisions Based on CCAMP Data**

#### **Salinas Watershed**

CCAMP initiated monitoring at twenty-eight sites in the Salinas watershed rotation area in 1999. Staff conducted monthly monitoring for conventional parameters at all sites between January 1999 and April 2000. In addition, staff collected benthic macroinvertebrate samples at nine of those sites. Staff assessed and summarized the monitoring data in the Salinas River Hydrologic Unit Report, available on the CCAMP website (<http://www.ccamp.org/ccamp/Reports.html>). Staff also used the CCAMP data to assess beneficial use impairment and add thirteen waterbody / pollutant combinations to the Impaired Waters List in the Salinas watershed. The Ag Monitoring Program was designed based on data collected by CCAMP.

In January 2006, CCAMP initiated the second round of watershed rotation area monitoring in the Salinas watershed. In addition to monthly monitoring at all sites, CCAMP staff collected benthic macro-invertebrate samples at eighteen sites and water toxicity samples at twenty-one sites in the watershed. CCAMP has not yet assessed this data or written the annual report. However, these data have been submitted for assessment in the update to the Impaired Waters List and the 305(b) Water Quality Assessment report. Three examples of problems identified during the monitoring year are listed below.

#### **1. Illicit Discharge**

CCAMP staff collaborated with other program staff and agencies to reduce storm drain discharges and identify sources of pollutants which flow from the industrial area west of Highway 101 to the Salinas Reclamation Canal at Airport Road.

CCAMP staff documented illicit discharge of broccoli pieces and elevated nutrients, bacteria, pesticides, chlorine and toxicity to invertebrate test species in flow from the storm drain discharge point at Airport Road and in the Reclamation Canal downstream of the discharge point. CCAMP staff relayed this data and information to stormwater and enforcement staff on a regular basis between January 2006 and April 2007.

Stormwater staff coordinated with staff from the City of Salinas to conduct follow-up inspections in the stormwater drainage area. Staff identified illicit discharges from Mann Packing. The City of Salinas issued a Notice of Violation to Mann Packing. Enforcement staff then referred the Mann Packing case to the Monterey County Deputy District Attorney who is now working with Mann Packing to eliminate all non-storm water discharges.

The City of Salinas completed a toxicity reduction evaluation for the drainage area and followed up with Mann Packing to connect their discharge to the City's industrial treatment facility. This action resulted in significantly reduced flow to the discharge point in the Reclamation Canal. However, other sources of pesticides, nutrients and bacteria at the monitoring site remain unidentified. Enforcement staff is working with the City of Salinas to prioritize industrial inspections and identify other discharges of pesticides, nutrient and bacteria to the stormwater system.

## 2. Stormwater Dry Weather Flows

CCAMP staff is currently collaborating with stormwater and enforcement staff to address dry-weather flows from the City's storm drain to the Salinas River near Davis Road. This storm drain connects the City's stormwater pump station to the Salinas River via an underground pipe.

Between January 2006 and March 2007 CCAMP staff documented elevated turbidity and bacteria levels in wet-weather monitoring. CCAMP data showed elevated nitrate levels in dry-weather monitoring. The City asserted that year round discharge at this site (dry weather flow) resulted from irrigation water on agricultural fields infiltrating into the degraded pipe. Stormwater staff has initiated conversations with the City of Salinas and will be evaluating compliance with their stormwater permit.

## 3. Toxicity

CCAMP staff coordinated with other Central Coast Water Board programs to address toxicity findings in the agriculture and urban affected waters of the Salinas Watershed.

CCAMP and the Ag Monitoring Program have identified widespread toxic effects to invertebrate test species (*Ceriodaphnia dubia*) in the agricultural and urban dominated watersheds of the lower Salinas Valley (Attachment 1). CCAMP collected and analyzed water samples from twenty-one sites in the Salinas Watershed rotation area. The Ag Monitoring Program collected toxicity data at fifteen additional sites in the watershed.

Staff found the following CCAMP sites, located in agricultural dominated areas, to be toxic to invertebrates: the Salinas Reclamation Canal (both up stream and downstream of the City of Salinas), two sites on the Tembladero Slough, the Old Salinas River, Quail Creek, and the Salinas River at Chualar and Greenfield. Staff also found toxicity to algal growth, which implies herbicide impacts, in samples from Quail Creek and Lower Tembladero Slough. Initial results showed toxicity to larval fish at two sites in the Salinas River; at Chualar and at Greenfield. Staff conducted follow up testing to identify the class of pollutant causing the toxicity but could not reproduce the result. This suggests that the cause of the initial toxicity may have degraded or was episodic in nature.

Staff also found CCAMP sites in urban areas of the Salinas watershed to be toxic to invertebrates: Atascadero Creek in Atascadero, Santa Rita Creek and the storm drain at Airport Road in Salinas.

The Ag Monitoring Program has made water column toxicity its highest priority for program follow-up. In 2006, the Ag Monitoring Program conducted follow-up monitoring on the original 25 monitoring sites by testing for a broad spectrum of organophosphates in water and sediment samples. Currently, the Ag Monitoring Program has initiated field inspections of operations enrolled under the waiver. Inspections will verify best management practice implementation, additional water quality problems, and staff will work with growers to develop solutions to problems.

As previously mentioned, toxicity results in urban drains and creeks have been shared with stormwater and enforcement program staff as well as the City of Salinas. Since October 2006, stormwater staff has been working with the City of Salinas to identify the source of the toxicity.

Toxicity data from both CCAMP monitoring and from the Ag Monitoring Program in the Salinas Watershed have been submitted for updating the Impaired Waters List. There are currently no listings in this watershed for toxicity (although there are listings for pesticides and un-ionized ammonia, both of which can be toxic).

### **Santa Maria Watershed**

CCAMP conducted initial monitoring in the Santa Maria Hydrologic Unit between January 2000 and April 2001. CCAMP conducted monthly monitoring at 26 sites and collected benthic macro-

invertebrates at ten sites. These data are summarized in a peer reviewed report available on the CCAMP website ([http://www.ccamp.org/ccamp/documents/312HU\\_Report\\_Final.doc](http://www.ccamp.org/ccamp/documents/312HU_Report_Final.doc)). These data were the basis for the addition of twenty waterbody / pollutant combinations to the Impaired Waters List and served as a basis for determining which waters would be monitored by the Ag Monitoring Program.

TMDL staff completed the Fecal Coliform, and Nitrate and Unionized Ammonia Preliminary Project Reports for the Santa Maria and Oso Flaco watersheds. Staff is currently revising Preliminary Project Reports to include technical and CEQA-related comments from meetings with stakeholders. These reports rely on CCAMP data. The TMDLs are scheduled to go before the board in Sept 2008.

In January 2007, CCAMP initiated the second round of watershed rotation area monitoring in the Santa Maria watershed. Based on data assessment from 2000, CCAMP added four additional monitoring locations to the site list; two in urban- dominated areas and two sites in agricultural-dominated waters. New urban sites include Main Street Canal at the City's storm drain discharge point and Orcutt-Solomon Creek at the Orcutt City limit. Due to toxicity results and elevated nutrient and coliform concentrations in Orcutt-Solomon Creek, CCAMP also added two sites in the Green Valley Creek watershed, a tributary to this agricultural dominated creek. This year CCAMP monitoring in the Santa Maria watershed consists of thirty sites monitored monthly for conventional analysis. Staff will monitor toxicity at fourteen sites and conduct benthic macro-invertebrate assessments at eight sites.

CCAMP recently conducted five months of monitoring for conventional parameters and one round of water toxicity monitoring in the Santa Maria rotation area. Results from the Main Street Canal have already been the focus of follow-up work in this watershed (as discussed below). CCAMP now has two monitoring sites on the Main Street Canal; at the City's storm drain discharge point and downstream of the agriculturally-dominated channel below the Main Street crossing. Monitoring results have shown elevated ammonia and nitrate levels in monthly monitoring. As mentioned in Attachment 1, CCAMP toxicity monitoring revealed 100% toxicity to invertebrates, larval fish and algae at both locations. Staff relayed this data to the City of Santa Maria, and staff of the Stormwater, Ag, and TMDL programs.

CCAMP, stormwater and Ag Regulatory program staff are collaborating to get the City of Santa Maria and the Ag Monitoring Program to conduct inspections and identify potential sources of ammonia and pesticides in this drainage area.

Toxicity data collected by CCAMP, the Ag Monitoring Program, and grant-funded projects will be evaluated in the update to the Impaired Waters List. There are currently no listings in this watershed for toxicity (although there are listings for pesticides and un-ionized ammonia, both of which can be toxic).

Staff is developing a TMDL for unionized ammonia which includes the Main Street Canal. CCAMP and Ag Monitoring Program data will provide the primary data for TMDL compliance evaluation.

#### **Coordination with Other External Agencies and Organizations**

CCAMP staff coordinates with several local agencies and organizations collecting data from coastal streams and in near shore areas. Several of these efforts are discussed in more detail in Attachment 2 – Executive Officers report to the Board, May 10-11, 2007. They include coordination with the Central Coast Long-Term Environmental Assessment network (CCLEAN) and the Department of Health Services. CCAMP continues to work with the Department of Fish and Game Office of Spill Prevention and Response (DFG-OSPR) on health risk assessment for the Southern Sea Otter. CCAMP staff has co-authored a number of peer reviewed journal articles with DFG-OSPR staff.

CCAMP staff serves on the technical advisory committee for the Monterey Bay National Marine Sanctuary Integrated Assessment and Monitoring Project. This grant project is accumulating and submitting data from multiple sources into the SWAMP batch upload format developed by CCAMP staff for assessment purposes. CCAMP continues providing technical support and data collection support for both the Morro Bay National Estuary Program Volunteer Monitoring Program and the Monterey Bay National Marine Sanctuary Citizens Monitoring Network.

### **Conclusion**

The basic CCAMP study design has been in place since the inception of the CCAMP program in 1998. CCAMP has established 184 long term monitoring sites throughout the Region. CCAMP completed one full round of rotation area monitoring and a second round of monitoring in Pajaro, Salinas and Santa Maria watersheds. CCAMP also completed five full years of coastal confluences monitoring.

CCAMP will be a primary data provider for measuring our goals for the Region's Vision of healthy, functioning watersheds. CCAMP staff is working with the Vision Assessment Team to define "health" and develop multi-parameter indices that will be used to measure health.

One of the primary purposes of CCAMP is to support the Impaired Waters listing process and the 305(b) Water Quality Assessment. CCAMP data is also heavily used by permit staff, enforcement staff, and others for regulatory and management decision-making.

### **RECOMMENDATION**

This is an informational status report, which staff will augment with a presentation at this Board meeting. Staff will periodically report to the Board on its CCAMP program and will provide a summary of monitoring data, assessments, and coordinated efforts.

### **ATTACHMENTS**

1. Map showing rotation areas, schedule, and location of coastal confluences sites.
2. Executive Officer's Report to the Board. Staff Report for regular meeting of May 10-11, 2007 (CCAMP section only).