SWAMP
Surface Water Ambient Monitoring Program

Monitoring Plan	2013

North Coast
Agricultural Lands Discharge Program

Waiver Development Support

Baseline Conditions Monitoring

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Introduction

The Porter-Cologne Water Quality Control Act and the federal Clean Water Act (CWA) direct that water quality protection programs be implemented to protect and restore the integrity of waters of the State. California Assembly Bill 982 (Water Code Section 13192; Statutes of 1999) requires the State Water Resources Control Board (SWRCB) to assess and report on the State's water quality monitoring programs.

AB 982 required the SWRCB to prepare a proposal for a comprehensive surface water quality monitoring program. The SWRCB report to the Legislature entitled, "Proposal for a Comprehensive Ambient Surface Water Quality Monitoring Program" (November 2000 Legislative Report) proposed to restructure existing water quality monitoring programs into a new program, the Surface Water Ambient Monitoring Program (SWAMP). The SWAMP was envisioned as an ambient monitoring program that would be independent of, yet coordinated with, other water quality regulatory programs, and serve as a measure of: (1) the overall status of the beneficial uses of the State's water resources, and (2) the overall effectiveness of the prevention, regulatory, and remedial actions taken by the State Water Board and the nine Regional Water Quality Control Boards (RWQCB). To implement this directive, funding for ambient surface water quality monitoring was allocated to the State Water Board (and thereby to the Regional Water Boards) beginning in State Fiscal Year 2000–2001.

Overview of the Surface Water Ambient Monitoring Program (SWAMP)

The SWAMP is a comprehensive environmental monitoring program focused on providing the information the SWRCB and RWQCBs need to effectively manage the State's water resources. The SWAMP is designed to integrate all existing water quality monitoring occurring at the SWRCB and RWQCBs and coordinates with monitoring programs at other agencies, permitted facilities, and citizens groups. The RWQCBs establish monitoring priorities for the water bodies within their jurisdictions, in coordination with the SWRCB. This monitoring is done in accordance with the protocols and methodologies laid out in the SWAMP program.

SWAMP Goals

SWAMP is intended to meet four goals:

1. Create an ambient monitoring program that addresses all hydrologic units of the State using consistent and objective monitoring, sampling and analytical methods; consistent data quality assurance protocols; and centralized data management. This will be an umbrella program that monitors and interprets those data for each hydrologic unit at least one time every five years.
2. Document ambient water quality conditions in potentially clean and polluted areas. The scale for these assessments ranges from the site-specific to statewide.
3. Identify specific water quality problems preventing the SWRCB, RWQCBs, and the public from realizing beneficial uses of water in targeted watersheds.
4. Provide the data to evaluate the overall effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State.

As designed, the Surface Water Ambient Monitoring Program (SWAMP) is a combination of (1) regional monitoring to provide a picture of the status and trends in water quality and (2) site-specific

monitoring to better characterize problem and clean locations. This approach balances these two important monitoring needs of the SWRCB and serves as a unifying framework for the monitoring activities being conducted by the SWRCB and RWQCBs. The coordinated SWRCB and RWQCB involvement in study design and sampling is critical to providing comprehensive, effective monitoring (Report to the Legislature, November 30, 2000, Pg. iv).

Although the original intent was to develop a program with adequate and secure funding to meet these goals, sufficient funding was never secured to create and fully implement a complete and robust region-wide monitoring plan as well as site-specific studies as outlined in the original design. As a consequence, the North Coast Regional Water Quality Control Board's (NCRWQCB) SWAMP monitoring efforts through fiscal year (FY) 2007-08 focused on the first component of the overall program design, "regional monitoring" of status and trends. The "regional monitoring" component of the Regional SWAMP Program is responsive to the four stated goals of the statewide SWAMP Program, but is most responsive to goals 1, 2, and 3. Beginning in calendar year (CY) 2008, through a change in contracting and implementation of our monitoring efforts, the Regional SWAMP effort has been able to expand the scope of the Program to include "site-specific" monitoring to more fully respond to goals 3 and 4.

The watershed evaluation process employed by the NCRWQCB is responsive to the Watershed Management Initiative as called for in the State Water Resources Control Board Strategic Plan (updated in 2001). Implementation of the Watershed Management Initiative involves designating Watershed Management Areas (WMAs) and performing monitoring with the following objectives:

- Assessing water quality related issues on a watershed basis,
- Developing prioritized water quality goals for watersheds from the issues, and
- Addressing the issues with various programs.

NCRWQCB SWAMP Program Goals and Objectives

The NCRWQCB SWAMP program now includes multiple active projects, and is also in the process of analyzing data and preparing reports for two past projects. All of these projects are intended to meet the above four stated goals of the SWAMP Program (see page 2):

Current Projects:

- Status and Trends in the North Coast Region (FY2000-01 – present)
    - Addresses Goals 1, 2 and 3
- Garcia River Watershed Condition Monitoring (CY 2008 – present)
    - Addresses Goals 3 and 4
- Freshwater Beaches Monitoring Program (CY 2011 – present)
    - Addresses Goals 2, 3 and 4
- Santa Rosa Creek Bacteria Monitoring Program (CY 2013)
    - Addresses Goals 2, 3 and 4
- North Coast Agricultural Lands Discharge Program - Baseline Conditions Monitoring Program (CY 2013)
    - Addresses Goals 1, 2, 3 and 4

Past Projects:

- South Fork Eel Nutrient Study (CY 2010)
    - Addressed Goals 2, 3 and 4
- Russian River Nutrient Study (CY 2011)
    - Addressed Goals 2, 3 and 4
- Augmentation of the statewide SWAMP Reference Condition Monitoring Program (RCMP) (CY 2010 – CY2012)
    - Addressed Goals 3 and 4

This document only represents the monitoring plan for the NCRWQCB's North Coast Agricultural Lands Discharge Program - Baseline Conditions Monitoring Program for calendar year 2013, while the other projects listed above are addressed by separate monitoring plans which can be found on the State Water Board's SWAMP website:

http://www.waterboards.ca.gov/water_issues/programs/swamp/regionalreports.shtml

Goals and Objectives for the Ag Lands Monitoring Program in 2013

The overall goal of this monitoring project is to develop baseline data from which the NCRWQCB management can evaluate the effectiveness of, and adaptively manage the implementation of the NCRWQCB's Irrigated Agriculture Discharge Program (Ag Lands Program). This effort is designed to answer the following questions:

- Are contaminants detected in surface waters and/or depositional stream sediments in agriculturally dominated watersheds of the North Coast Region?
- Is sediment toxicity observed in depositional stream sediments located downstream of agricultural land use?
- Is water column toxicity observed in runoff downstream of agricultural land use?
- Is there a relationship between contaminant concentrations and specific agricultural land use types?
- Is there a relationship between contaminant concentrations and the level of agricultural intensity?
- What is the direction and magnitude of change in contaminant concentrations and/or toxicity over multi-year time periods?

North Coast Agricultural Lands Discharge Program - Description

Staff of the NCRWQCB are currently developing an Agricultural Lands Discharge Program to address water quality impacts associated with irrigated agricultural lands in the North Coast Region. Agricultural lands have the potential to contribute to water quality problems through the over-application of fertilizers and pesticides, human-caused erosion of sediment, pollutants in tailwater return flows, and the removal and suppression of riparian vegetation. The Regional Water Board staff are developing the Program to address these water quality issues and to meet the requirements of the California Water Code, the State Nonpoint Source Policy, and the Klamath River Total Maximum Daily Loads (TMDLs).

While the scope of the Ag Lands Program has not been finalized, it will include certain types of agricultural lands in the North Coast Region and address discharges of waste to waters of the State. Staff expect the Program to address waste discharges from agricultural lands such as row crops, vineyards, orchards, medicinal marijuana farms, nurseries, forage crops, and irrigated pasture. Dairies and dryland grazing are not included in the Program. Dairies are currently addressed through a separate NCRWQCB program and dryland grazing is expected to be addressed through a statewide effort that is currently under development.

Additional information is available on the NCRWQCB website:
http://www.waterboards.ca.gov/northcoast/water_issues/programs/agricultural_lands/

Monitoring Design

Protocols

This monitoring program is established to determine baseline conditions in areas of agricultural production and to measure changes in conditions over time based upon the effectiveness of the NCRWQCB's Agricultural Lands Discharge Program. The sample site selection will incorporate the protocols established by California's Surface Water Ambient Monitoring Program (SWAMP) (MPSL 2007 and MPSL 2009).

To provide scientifically sound and comparable data relative to both the Statewide SWAMP SPoT Program (SWAMP 2008b) and the NCRWQCB's Status and Trends Monitoring Program (NCRWQCB 2013), the NCRWQCB has incorporated the full analyte list and sampling protocols of both programs into the Ag Lands Baseline Monitoring Program.

Site Selection

This screening study is designed to obtain information on the range of constituent concentrations found in agricultural runoff in the North Coast Region's surface water and not to provide an investigation of specific sites.

Site selection is critical for evaluating trends in contaminant concentrations and effects. Site selection for the Ag Lands Baseline Monitoring Program will be targeted and based upon access to appropriate locations at the downstream portion of watersheds in which a specific type of agricultural activity is the predominate land use. Site selection parameters include:

- Locations at or near the base of a watershed;
- Availability of fine-grained depositional sediment;
- Locations most likely to characterize accumulation of contaminants from the watersheds;
- Locations where site-specific conditions are appropriate for the indicators selected (e.g., depositional areas, sufficient flow, appropriate channel morphology, substrate, etc.);
- Contamination potential: is the site amenable to seeing changes in contaminant concentration and effects over time?
- Critical habitat areas for listed species;

Six sites will be selected in waterbodies at points where contaminants released throughout the watersheds are likely to accumulate. These sites will be similar to the "integrator" sites used in the USGS NAWQA program; that is, sites located near discharge points of watersheds. Ideally, monitoring at these sites should characterize the cumulative contribution of contaminants from the target watersheds (See Figure 1).

Figure 1. Ag Lands Monitoring Program station locations **(SITES YET TO BE DETERMINED)**

MAPS TO BE INCORPORATED AS ACCESS TO SAMPLING LOCATIONS ARE GRANTED

Monitoring Activities

Sampling will occur in both wet and dry seasons. We anticipate conducting at least three separate sample events in the spring (wet season), one event in late spring/early summer (dry season), and at two additional sample events in the fall (wet season) during the course of this monitoring effort. All wet weather sampling will be rain-triggered. All of the sites will be sampled during stormwater runoff events. Runoff will be characterized by a single grab sample, if possible taken soon after 0.5 inches of rain in a given event has fallen.

All water grab samples collected for this effort will be used for chemical analysis of the constituents listed in Table 1 as well as water column toxicity testing with Ceriodaphnia.

The dry season sampling will occur during base flow or near-base flow conditions. These samples will include chemical analysis of the sediments as well as sediment toxicity testing with H. azteca. Sampling will occur at least one week after any rain event.

Analytes

During all site visits, this monitoring effort will collect standard field parameters, and grab samples for the analysis of conventional water quality constituents, water column metals concentrations, pesticides/herbicides and pesticide residues, PCBs, PAHs, PBDEs, and water column toxicity. Once per site, during base flow or near-base flow conditions, we will collect sediment samples to be analyzed for metals concentrations, pesticides/herbicides and pesticide residues, PCBs, PAHs, PBDEs, and toxicity. Table 1 lists the individual constituents and total number (#) of pesticide/herbicide analytes.

Sampling is expected to yield approximately 36 water samples for chemical analysis and water column toxicity testing, and six sediment samples for chemical and toxicity analysis.

Table 1. Analytes per Sample Category.

Field Measurements	
Dissolved Oxygen	pH
Specific Conductivity	Temperature
Conventional Water Chemistry	
Silica	Chloride
Alkalinity as CaCO3	Chlorophyll-a
Hardness as CaCO3	Soluble Reactive Phosphorous
Ammonia as N	Phosphorous as P (total)
Nitrate as N	Suspended Sediment Concentration
Nitrite as N	Total Dissolved Solids
Nitrogen, Total	Dissolved Organic Carbon
Sulfate	Total Organic Carbon
Total Metals	
Zinc (total and dissolved)	Silver
Chromium	Cadmium
Manganese	Lead
Nickel	Arsenic
Copper (total and dissolved)	Mercury
Organic Chemistry	
Organophosphate Pesticides (19)	Triazine Herbicides (18)
Organochlorine Pesticides (32)	Pyrethroids/Pyrethrins (16)
Polychlorinated Biphenyls (50)	Polynuclear Aromatic Hydrocarbons (47)
Fipronil	Glyphosates
PBDEs (12)	Carbamates (8)
Sediment and Water Toxicity	

Sample Collection

The field crews will collect the samples at sites where the geo-coordinates were previously recorded on the site reconnaissance form. If sampling work is being performed at a new station, the geo-coordinates and cross-referenced photographs, and other pertinent information shall be recorded on the appropriate field forms for future reference. Sufficient volume of water shall be collected in order to perform the analyses to be conducted at each station.

Sample collection and subsequent processing and testing will be performed according to protocols specified in the most recent version of the SWAMP Quality Assurance Project Plan (QAPP), the SWAMP Statewide Stream Pollution Trends Monitoring Program QAPP, and region-specific QAPPs/SOPs.

Data Management

All field data will be entered into the SWAMP database by NCRWQCB staff. All laboratory data will be submitted to the SWAMP Data Management Team (DMT) in SWAMP format by

the individual contract laboratories. All data will be managed by the SWAMP Data Management Team (DMT).

Quality Assurance

This monitoring study will be consistent with the SWAMP Statewide Stream Pollution Trends Monitoring Program Quality Assurance Project Plan (SWAMP 2010) and the
This monitoring study will be consistent with the SWAMP Quality Assurance Program Plan (SWAMP 2008a).

> *SWAMP Statewide Stream Pollution Trends Monitoring Program Quality Assurance Project Plan:*
> http://www.waterboards.ca.gov/water_issues/programs/swamp/qapp/qapp_spot_strms_pollute_final.pdf
>
> *SWAMP Quality Assurance Program Plan:*
> http://www.waterboards.ca.gov/water_issues /programs/swamp/docs/qapp/qaprp082209.pdf

Data Analysis and Assessment:

Data analysis and assessment will be statistically based, focusing on correlations with land use parameters and testing the significance of changes in parameter values over time. Thresholds (e.g., sediment quality objectives) can be applied to the data in separate 303(d) listings or other assessments. No assessment thresholds are proposed specifically for this program.

Schedule and Reporting

Monitoring for this project will begin in February 2013 and end in November 2013. Pending the availability of data, data analysis will be performed during September 2014 – December 2014. A technical report will be generated by NCRWQCB staff by May 31, 2015.

Data generated by this effort will enhance the State's ability to answer the general question: What is the status of California's surface water quality, and is it getting better or worse? Data generated through this effort can be used to comply with the Clean Water Act Sections 305(b) and 303(d) Integrated Report, which aims to assess all of California's waterbodies for impairment identification and protection. Data from this effort will also enhance Regional and Statewide monitoring programs; aid in the development of Regional Agricultural waivers; aid in evaluating the success of TMDLs; and help to develop and understand the relationships between human activities and stream pollution for NPS programs.

Technical reports summarizing the findings will be produced by NCRWQCB staff. Reports will be made available on the NCRWQCB's SWAMP website. All data will be reported and available to the public on the California Environmental Data Exchange Network (CEDEN) once all Quality Assurance has been completed.

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