SURFACE WATER AMBIENT MONITORING PROGRAM
(SWAMP)
FY 2002-03 WORKPLAN

FINAL*

California Regional Water Quality Control Board, San Diego Region
June, 02

*** some budget allocations still to be finalized**

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TABLES

1.0 Introduction

Monitoring and assessment of water quality and beneficial uses is essential in order to measure the success of the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs) in achieving their mission. Ultimately, the only meaningful measure of the success of the SWRCB and of the RWQCBs is the condition of water quality and beneficial uses. This can be determined only by monitoring and assessment - not by the long-standing practice of counting program activities, i.e., "beans."

More importantly, monitoring and assessment is essential in order for the RWQCBs and the SWRCB to be successful in achieving their mission. Monitoring and assessment of ambient water quality and beneficial uses is necessary in order to:

(a) Identify and characterize water quality and beneficial use problems and threats;
(b) Identify trends in water quality and beneficial uses;
(c) Determine whether water quality standards are met;
(d) Evaluate the uniqueness or pervasiveness of problems;
(e) Evaluate the severity of problems;
(f) Make decisions about which problems and which locations should be prioritized for action; and
(g) Make decisions about what actions should be taken.

The absence of information is not the same as the absence of a problem. Likewise, the availability of more information about a problem in a particular location does not necessarily mean that particular problem is more severe than a problem at another location about which less information is available.

In accordance with Clean Water Act section 305(b), the SWRCB and RWQCBs periodically compile an inventory of the state's major waters and the water quality condition of those waters, using monitoring data and other pertinent information. This inventory is known as the Water Quality Assessment. Waters are categorized as good, intermediate, impaired, or of unknown quality. Impaired waters are categorized in accordance with requirements of various Clean Water Act sections [e.g. 131.11, 303(d), 304(m), 304(s), 304(l), 314, and 319].

The Water Quality Assessment is the foundation upon which the TMDL Program is built. Although considerable funding has been devoted to the TMDL program recently, the Water Quality Assessment Program has long been and continues to be inadequately funded. Clearly, this makes no sense. It is impossible to make sound decisions about whether and where TMDLs are needed, about which TMDLs should be done, and about when various TMDLs should be done, without adequate monitoring and assessment.

There is a great need for more extensive and more thorough monitoring and assessment of the waters of the San Diego region. Monitoring and assessment, for both status and trends, needs to be planned, ongoing, and continuous. Despite its importance, ambient monitoring and assessment do not receive the attention they should and tend to fall through the cracks. This must change. Obtaining adequate funding to conduct a robust Water Quality Assessment Program is now one of the top priorities of the California Regional Water Quality Control Board, San Diego Region (SDRWQCB). SDRWQCB is also evaluating how to assign and structure ambient monitoring and assessment work so as to make the most of available resources. The SWRCB and RWQCBs have received resources to continue the Surface Water Ambient Monitoring Program (SWAMP). Although SWAMP resources (particularly for staff) are not nearly adequate to do what needs to be done, the funding that has been provided is a significant step in the right direction. SDRWQCB intends to use SWAMP resources so as to ensure that monitoring is conducted in each hydrologic unit once in every five-year period. Although all hydrologic units will be monitored, current funding will enable only cursory monitoring and assessment to be done. Particularly since funding is so limited, selecting locations to be monitored, performing site reconnaissance, and deciding what to monitor for is an important task for staff. Initially, staff intends to prioritize monitoring that is indicative of effects (e.g., toxicity testing, bioassessment,

and benthic community analyses) rather than monitoring that simply indicates the presence and amount of a particular pollutant or class of pollutants.

Ambient monitoring is not and does not need to be conducted only by SWRCB / RWQCB staff. Academic and other research groups, dischargers, and other stakeholders all have a role in monitoring and assessment. Although there is certainly a need for more extensive and more thorough monitoring of the region's waters, better coordination of monitoring efforts and better management of information is also needed in order to increase the value, usefulness, accessibility, and use of information obtained from past, ongoing, and future monitoring efforts.

Coordination of monitoring efforts is needed to ensure that appropriate and useful information is acquired, to enable sharing of such information, and to avoid both information gaps and duplicative monitoring. Since monitoring is conducted by various agencies and as part of various programs, communication and cooperation between agencies and programs is necessary in order to coordinate monitoring efforts. A monitoring coordination program will be initiated in January 2003 to identify and evaluate regulatory and non-regulatory monitoring efforts (many of these have already been identified in Table 4) in the San Diego Region and to coordinate the SWAMP monitoring efforts with these programs.

The more accessible information is, the more useful it is, and the more likely it is to be used. Since monitoring information (and other information pertinent to water quality and beneficial uses) is location specific, a geographic information system (GIS) would be an extremely useful tool for managing and retrieving monitoring information and other information pertinent to water quality and beneficial uses. SDRWQCB will pursue development and implementation of a statewide GIS for managing and retrieving such information, as well as the funding to make use of it.

2.0 Monitoring Sites

There are eleven hydrologic units in the San Diego region. SDRWQCB plans to focus SWAMP monitoring efforts on two hydrologic units in each of four fiscal years and three hydrologic units in a fifth fiscal year. This approach will ensure that SWAMP monitoring is conducted in each hydrologic unit in the region over a five-year period. The planned schedule for rotation of SWAMP monitoring among San Diego Region hydrologic units is summarized in Table 1. Depending on the results of monitoring in any given year, it may be appropriate to conduct follow-up monitoring before completion of the five-year cycle. If/when sufficient funding is available in the future, the schedule may be revised to shorten the rotation cycle (e.g., to a three-year period.)

Given the anticipated FY 2002-03 SWAMP funding allocation for the San Diego region (~$241,000), a probability-based, regional approach for selecting monitoring sites does not appear to be feasible. Consequently, for FY 2002-03, SDRWQCB plans a targeted, site-specific approach with "pre-selected" monitoring sites. If/when sufficient funding is available in the future, a probability-based, regional approach may be used to select some or all monitoring sites.

Planned SWAMP monitoring sites in all San Diego region hydrologic units are identified in Table 2. Locations of monitoring sites are subject to revision. The exact locations of monitoring sites will be selected to enable information to be obtained on each of the selected indicators. The number of sites, the frequency of sampling, and/or the suite of analyses to be conducted may increase or decrease, depending on the availability of SWAMP funding. Due to decreasingly predictable flows in many streams, alternate sites have been identified and will be prioritized in order to ensure a full complement of samples is collected throughout the watershed in any given year. The alternate sites were selected using the same criteria discussed above. Prior to sampling, a detailed reconnaissance will be performed at each selected site. The reconnaissance will include identification of access issues, a habitat assessment, photo-documentation, and mapping of the site. For sites in the Carlsbad and Los Penasquitos Hydrologic Units, the reconnaissance was completed in December 2001. For sites in the San Juan Creek Hydrologic Unit and Otay Hydrologic Units, the reconnaissance will be completed by August 30, 2002. Reconnaissance for site in the Santa Margarita and San Dieguito Hydrologic

Units will be completed shortly thereafter. Tables 2 and 3 have been updated to include available reconnaissance information.

2.1 Watershed Characteristics

The Santa Margarita Hydrologic Unit (HU 902.00) is a rectangular area of approximately 750 square miles. It includes portions of US Marine Corps' Camp Pendleton, as well as the civilian populations of Murrieta, Temecula, and part of Fallbrook. The Santa Margarita Hydrologic Unit is comprised of the following nine hydrologic areas: the Ysidora, Deluz, Murrieta, Auld, Pechanga, Wilson, Cave Rocks, Aguanga and Oak Grove. Annual precipitation ranges from less that 12 inches near the coast to more than 45 inches inland near Palomar Mountain. The major surface water storage areas are Vail Lake and O'Neil Lake.

The Santa Margarita Hydrologic Unit is drained largely by the Santa Margarita River, Murrieta Creek and the Temecula Creek. The Santa Margarita River flows approximately 27 miles from the confluence of Temecula Creek and Murrieta Creek toward the Pacific Ocean to the Santa Margarita Lagoon, which lies within the Camp Pendleton Naval Reservation of the US Marine Corps. The slough at the mouth of the river is normally closed off from the ocean by a sandbar. The Santa Margarita River provides groundwater recharge to Camp Pendleton's only domestic water supply. Beneficial uses include MUN, AGR, IND, REC1, REC2, WARM, COLD, WILD and RARE.

The San Dieguito Hydrologic Unit (HU 905.00) is a rectangular-shaped area of about 350 square miles. It includes the San Dieguito River and its tributaries, including Santa Ysabel and Santa Maria Creeks. The San Dieguito Hydrologic Unit is comprised of the following five hydrologic areas: Solana Beach, Hodges, San Pasqual, Santa Maria Valley and Santa Ysabel. The HU contains two major reservoirs, Lake Hodges and Sutherland Reservoir. The San Dieguito Lagoon is located at the mouth of the San Dieguito River. The lagoon forms the northerly boundary of the City of Del Mar. The lagoon is normally closed off from the ocean by a sandbar. Beneficial uses include MUN, AGR, IND, PROC, REC1, REC2, WARM, COLD, WILD, RARE, BIOL, EST, MAR and MIGR.

3.0 Objectives

SWAMP monitoring in the San Diego region is intended to provide reliable, high quality information necessary to produce water quality assessment [305(b)] and impaired waters [303(d)] lists that are more comprehensive and more defensible than those of past years. At this time, the primary objectives for SWAMP monitoring in the San Diego region are those identified as numbers 9, 10, and 11 in the "Site Specific Monitoring" section of the SWRCB Report to the Legislature (See table).

Number	Primary Objectives for SWAMP Monitoring
9	At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pollutants, identify specific locations of degraded water or sediments in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition, and chemical concentration.
10	At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pollutants, identify specific locations of degraded sediment in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition, and chemical concentration.
11	Identify the areal extent of degraded sediment locations in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, benthic community analysis, habitat condition, and chemical concentration.

These objectives are related to the question of whether aquatic populations, communities, and habitats are protected. There are a number of other questions and objectives pertinent to other beneficial uses of surface waters in the San Diego region. Those questions are being, will be, or

should be addressed by other entities and/or other monitoring programs and/or may be included in the SDRWQCB objectives for SWAMP monitoring in the future if/when additional SWAMP funding is available.

3.1. General Study Design

3.1.1. Overview of General Approach

Given the anticipated funding constraints mentioned above, SDRWQCB staff plans to focus SWAMP monitoring efforts on main stem rivers and streams and major tributaries within the various hydrologic units. If/when additional funding is available in the future, SDRWQCB staff plans to expand SWAMP monitoring efforts to include estuaries, coastal lagoons, bays, harbors, ocean waters, and other waters of the region.

In general, SDRWQCB plans to locate monitoring sites on:
a. Main stem rivers and streams, just above tidal influence;
b. Main stem rivers and streams just above the confluence with major tributaries, and
c. Major tributaries just above the confluence with the main stem rivers and streams.

For various reasons, locations of certain stations may not fit these general rules. The site reconnaissance, which provides assessment beyond the reach scale, will provide the necessary information to support site selection or identify alternate sites that better support the primary objectives discussed above.

All San Diego region SWAMP sampling and analyses will be performed under the SWRCB statewide master contract with the Department of Fish and Game. This arrangement will make use of the monitoring expertise of the Department of Fish and Game and avoid the need for SDRWQB staff to manage a region-specific contract. SDRWQCB staff will conduct site reconnaissance as indicated in Tables 1, 2, and 3.

Stream flow conditions in the San Diego region vary substantially seasonally (and from year to year). The four planned sampling periods are intended to cover different stream flow conditions, i.e.,

February – between storm events
April – high base flow rates
May / June – declining base flow rates (and bioassessment index period)
September / October – minimum base flow rates (and bioassessment index period)

There are no surface water flows in some San Diego region streams at certain times of the year. Streams with varying flow regimes drain the Santa Margarita and San Dieguito watersheds. In these watersheds, monitoring efforts will be tiered with an emphasis on Winter (February) and Spring (April) monitoring with fully integrated monitoring limited to selected streams and rivers. As discussed above in Section 1.0, partnerships with other agencies, non-governmental organizations, and Tribal Nations will be sought in January 2003 to expand the planned monitoring in these watersheds.

3.1.2. Water Quality Indicators

In general, SDRWQCB staff plans to use the same suite of indicators at all monitoring sites in the first years of SWAMP. SDRWQCB staff plans to transition to a tiered approach in which SWAMP monitoring at sites lower in a watershed emphasizes integrative measures/indicators and some sites are monitored for only a subset of parameters

In order accomplish the SWAMP monitoring objectives identified above, SDRWQCB plans to use the indicators (described in the SWRCB Report to the Legislature) listed in the table below. This table also shows the link between the monitoring objectives, indicators and beneficial uses. These indicators will be used in all waterbodies sampled in the Santa Margarita and San Dieguito Hydrologic Units.

Additional indicators may be used if/when additional SWAMP funding is available.

LIST OF INDICATORS FOR SWAMP MONITORING

Beneficial Use	Monitoring Objectives[1]	Category	Indicator
Fish and Shellfish Contamination	9 & 10	Contaminant exposure	Fish tissue chemistry Shellfish tissue chemistry Coliform bacteria in shellfish Fecal coliform bacteria in water
Aquatic Life	9, 10 & 11	Biological response	Sediment toxicity Water toxicity
		Pollutant exposure	Shellfish or fish tissue chemistry Nutrients Inorganic and organic water chemistry
		Habitat	Sediment grain size and gradations Hydrogen sulfide (sediment) Ammonia (water)

[1] The number refers to the monitoring objective discussed previously under Section 3.0

4.0 Activities Planned for FY 2002-03

4.1. List of Water Bodies to be Sampled in FY 2002-03

Water bodies in the San Diego region where SWAMP monitoring is planned in FY 2002-03 are identified in Table 3.

4.2. Review of Available Information

SDRWQCB recognizes the need to make better use of information produced by monitoring efforts other than SWAMP and to coordinate and integrate SWAMP monitoring with other monitoring efforts. These non-SWAMP monitoring efforts include:

a. Other SWRCB/RWQCB monitoring programs (e.g., State Mussel Watch Program, Toxic Substances Monitoring Program, and Bioasssessment);
b. Monitoring conducted in accordance with SWRCB/SDRWQCB regulatory requirements (e.g., receiving water monitoring required by municipal storm water permits);
c. Monitoring conducted in accordance with regulatory requirements of other agencies; and
d. Monitoring conducted independent of regulatory requirements.

At any given level of combined expenditures on monitoring ambient surface waters, better coordination and integration of SWAMP monitoring with these other monitoring efforts will result in more comprehensive information (with respect to space, time, and parameters) about the condition of waters in the San Diego region

Table 4 summarizes some (but not necessarily all) of the ongoing or recent monitoring (other than SWAMP monitoring) in the Santa Margarita and San Dieguito hydrologic units (i.e., the two hydrologic units where FY2002-03 SWAMP monitoring will be conducted in the San Diego region).

4.3 Specific Sampling Design / Sample Collection

4.3.1 Site Reconnaissance

Site reconnaissance has been identified as an important tool in effective assessment of ambient water quality monitoring programs. SDRWQCB will conduct sample site reconnaissance that will:

a. Document local watershed characterization and features;
b. Document instream habitat conditions;
c. Document near stream habitat conditions;
d. Measure and characterize flow regime;

e. Identify land ownership and access issues;
f. Establish a California Stream Bioassessment Protocol (CSBP) Reach;
g. Perform a Physical Habitat Assessment;
h. Determine if the site meets reference site criteria for bioassessment;
i. Provide photo-documentation of the site;
j. Record on the ground GPS coordinates for the site;
k. Map the site on both a watershed and reach scale;
l. Identify and prioritize nearby alternate sites for contingency or follow-up monitoring.

For sites in the Santa Margarita Hydrologic Unit and San Dieguito Hydrologic Units, the reconnaissance will be completed by June 30, 2003. Tables 2 and 3 have been updated to include available reconnaissance information.

Field location of sample collection sites
The field crew will collect samples at sites where the latitude and longitude (and GPS coordinates) were previously recorded during reconnaissance of these stations. If a new station is being sampled, the latitude and longitude, as well as GPS coordinates and cross-referenced photographs, will be provided for future reference. Any confusion about locating a site or proceeding to a prioritized alternate site will be resolved in consultation with a SDRWQCB staff member present in the field or via phone contact.

4.3.2. Media types and volumes
The numbers of samples of each media type (water, sediment, benthos, and tissue) to be collected are shown in Table 5.

A sufficient quantity of water, sediment, benthos, or tissue will be collected in order to perform the analyses to be conducted at each station, as well as to allow for archiving of samples for future analysis, as shown in Table 5. Sample collection and subsequent processing and testing will be performed according to the most recent version of the SWAMP QAPP.

Sediment samples will contain at least 90% fines (silt, mud, and/or clay). The field crew will endeavor to collect enough sediment at sediment collection sites to conduct the grain size, hydrogen sulfide, and toxicity testing (*Hyalella sp.*) on the same sample.

4.3.3. Bioassessment
Samples for bioassessment will be collected using bioassessment protocols found in the San Diego Region Ambient Bioassessment Program. These protocols will be in use until SWAMP has established it's own protocols. Samples will be collected two (2) times (in May/June and October) at twelve (12) monitoring sites, as shown in Table 3. Each bioassessment site will be surveyed during reconnaissance to select a length of stream that contains at least three (3) [preferably five (5)] riffle-pool sequences. One (1) BMI sample will be collected along a transect in each of three (3) randomly selected riffles, or if only one riffle is available, along three (3) randomly selected transects. Regional Board staff will conduct all bioassessment sample collection. The California Department of Fish and Game (CDFG) will perform only the analysis of the samples.

The bioassessment samples will have a Quality Assurance/Quality Control (QA/QC) done at a frequency of five percent (5%).

The SDRWQCB has required bioassessment monitoring in several programs that is compatible with the monitoring that will be performed in its SWAMP efforts. This data will be evaluated and may be incorporated in the SWAMP data set.

4.3.4. Conventional Water Chemistry
Samples for conventional water chemistry analyses will be collected four (4) times (February, April, May/June, and September/October) at each monitoring site. The conventional chemistry samples will be collected simultaneously with the "biotic effects" (water toxicity, sediment toxicity,

grain size, hydrogen sulfide) samples. This will allow better understanding of the possible causes or nature of any biotic effects observed in the toxicity testing.

4.3.5. Sediment/Water Toxicity Testing (biotic effects)
Samples for "biotic effects" analyses will be collected four (4) times (February, April, May/June, September/October) at eleven (11) monitoring sites, as shown in Table 3. The "biotic effects samples will be collected simultaneously with the conventional chemistry samples at each site.

The "biotic effects" samples will be analyzed for sediment grain size, hydrogen sulfide, and toxicity (*Hyalella sp.*), and freshwater toxicity (*Ceriodaphnia sp.* and*, Selenastrum sp.*). The sample used for freshwater toxicity testing (*Ceriodaphnia sp.* and *Selenastrum sp.*) will be collected near (or within as close a proximity as feasible to) the sediment collection site.

Sediment samples will contain at least 90% fines (silt, mud, and/or clay). The field crew will endeavor to collect enough sediment at sediment collection sites to conduct the grain size, hydrogen sulfide, and toxicity testing (*Hyalella sp.*) on the same sample.

4.3.6. Toxic Substances Monitoring (TSM)
TSM samples will be collected one (1) time (June) at four (4) monitoring sites, as shown in Table 3.

4.4 Laboratory Analysis
Laboratory analyses will be conducted in accordance with standard methods specified in the SWRCB statewide master contract with the Department of Fish and Game. In general, SDRWQCB staff does not anticipate needing special analytical techniques or detection limits. However, detection limits of 0.05µg/L for diazinon and 0.014 µg/l for chlorpyrifos are needed.

Planned laboratory analyses to be performed on samples collected at each planned FY 2002-03 San Diego region SWAMP monitoring site are summarized in Table 3.

4.5 Data Quality Evaluation and Data Reporting
Data quality evaluation and data reporting will be as specified in the SWAMP QAPP. Quality control will include a 5% field duplicate level for all parameters. SDRWQCB staff does not anticipate needing additional special data quality evaluation or data reporting procedures.

4.6 Deliverable Products
Deliverable products will be as specified by Task Order. SDRWQCB does not anticipate needing special deliverable products.

4.7 Significant dates for sample collection and reporting
As indicated previously, stream flow conditions in the San Diego region vary substantially seasonally (and from year to year). The four planned sampling periods are intended to cover different stream flow conditions, i.e.,

February – between storm events
April – high base flow rates
June – declining base flow rates (and bioassessment index period which may require sampling in May)
September / October – minimum base flow rates (and bioassessment index period)

There are no surface water flows in some San Diego region streams at certain times of the year. The selected monitoring sites in the Santa Margarita and San Dieguito Hydrologic Units are expected to have surface water flows during all of the planned sampling periods. However, the sampling design for watersheds characterized by ephemeral and intermittent streams will emphasize Winter (February) and Spring (April) sampling followed by Summer (May / June) and Fall (September / October) at sites that support perennial flow.

Reconnaissance for the Santa Margarita and San Dieguito Watersheds should be completed by October of 2002. It is hoped that sampling will begin sometime in 2003 and will most likely run concurrently with sampling in the San Juan and Otay Watersheds as part of the FY 2001-02 work plan.

4.8 "Sample Throughput Schedule"
The sample throughput schedule will be as specified in the SWRCB statewide master contract with the Department of Fish and Game. Although a short turn-around time is desirable, SDRWQCB staff does not want to reduce sampling frequency, the number of sampling sites, and/or the number of parameters in order to reduce turn-around time. SDRWQCB does not anticipate needing a special sample throughput schedule.

4.9 Budget
The planned FY2002-03 SWAMP budget for the San Diego region is summarized in Table 5. This table has been updated to reflect the revised costs and available resources. A few items are still not finalized (Region 9s share of "Pass through subcontract" and "Logistics Fee"). The cost of these items will be finalized as soon as final figures are available from CDFG.

5.0 Working Relationships
The decision matrix shown in the SWRCB SWAMP Guidance for Site-Specific Monitoring Workplans is appropriate for the SWAMP monitoring to be conducted in the San Diego region. It is reproduced below and describes the general relationships for implementing the regional monitoring portion of SWAMP.

Task	Responsible Organization		
	SWRCB	RWQCBs	Contractors
Develop contract(s) for monitoring services.	●	●	●
Identify water bodies or sites of concern and clean sites to be monitored.		●	
Identify site-specific locations with potential beneficial use impacts or unimpacted conditions that will be monitored.		●	
Decide if concern is related to objectives focused on location or trends of impacts.		●	
Select monitoring objective(s) based on potential beneficial use impact(s) or need to identify baseline conditions.		●	
Identify already-completed monitoring and research efforts focused on potential problem, monitoring objective, or clean conditions.		●	●
Make decision on adequacy of available information.		●	●

Task	Responsible Organization		
	SWRCB	RWQCBs	Contractors
Prepare site-specific study design based on monitoring objectives, the assessment of available information, sampling design, and indicators.	● (Work Plan (Review Role)	●	●
Implement study design. (Collect and analyze samples.)			●
Track study progress. Review quality assurance information and make assessments on data quality. Adapt study as needed.	● (Review Role)	●	●
Report data through SWRCB web site.	●	● (Coordination Role)	●
Prepare written report of data.	●	●	●

6.0 List of Attachments

Table 1 San Diego Region Planned SWAMP Monitoring Rotation Schedule
Table 2 San Diego Region Planned SWAMP Monitoring Sites
Table 3 San Diego Region Planned SWAMP Monitoring FY 2002-03
Table 4 San Diego Region Monitoring (Other Than SWAMP) in Santa Margarita (901) and San Dieguito (910) Hydrologic Units
Table 5 San Diego Region Planned SWAMP Monitoring Budget FY 2002-03

Note:
Tables 3, 4 and 5 are attached in file “02-03 Tables 3 to 5.xls”

Table 1 – San Diego Region Planned SWAMP Monitoring Rotation Schedule

HU #	HYDROLOGIC UNIT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
		2000-01	2001-02	2002-03	2003-04	2004-05
901	San Juan HU	x	22 sites	x	x	x
902	Santa Margarita HU	x	x	7 sites	x	x
903	San Luis Rey HU	x	x	x	13 sites	x
904	Carlsbad HU	14 sites	x	x	x	x
905	San Dieguito HU	x	x	4 sites	x	x
906	Peñasquitos HU	8 sites	x	x	x	x
907	San Diego HU	x	x	x	13 sites	x
908	Pueblo San Diego HU	x	x	x	x	3 site
909	Sweetwater HU	x	x	x	x	10 sites
910	Otay HU	x	11 sites	x	x	x
911	Tijuana HU	x	x	x	x	12 sites
	Totals	22	33	11	26	25

Number of sites represents identified sites including alternates.

x = not sampled in that year

Table 2 - San Diego Region Planned SWAMP Monitoring Sites

SWAMP Year 2 (FY 02/03) Rain Year Sampled (03/04)

Santa Margarita Watershed

	Stream	HSA	# of Stations	Location of Sample Site	Sample Periods	Reconnaissance
	Deluz Creek	902.21	1	DLZ4 GPS 33.2629.0N 117.1926.1W Surveyed in August 2001 – dry Access via Camp Pendleton	February April May/June Sep/Oct	October 02
	Rainbow Creek	902.20	1	RNB4 GPS 33.2737.2N 117.1251.7W Just above confluence with Santa Margarita River	February April May/June Sep/Oct	October 02
	Roblar Creek	902.20	1	ROB2 GPS 33.2317.1N 117.1938.4W Reach located below falls approximately 0.3 miles from De Luz Rd crossing. Access via Camp Pendleton.	February April May/June Sep/Oct	October 02
	Santa Margarita River	902.10 – 902.20	1	SMR11 GPS 33.____ N 117.____W At mouth of river, west of I5.	February April May/June Sep/Oct	October 02
	Sandia Creek	902.22	1	SND1 GPS 33.2928.1N 117.1504.2W Reference station.	February April May/June Sep/Oct	October 02
	Temecula Creek	902.50	1	TEM3 GPS 33.____N 117.____W GPS not available yet. (2001/2002 season) Upstream of confluence with Murrietta Creek.	February April May/June Sep/Oct	October 02
	Warm Springs Creek	902.30	1	WRM2 GPS 33.____N 117.____W Above confluence with Murrietta Creek	February April May/June Sep/Oct	October 02
		Subtotal	7	* = See San Diego Bioassessment Reference Site for details		

San Dieguito Watershed

	Stream	HSA	# Stations	Location of Sample Site	Sample Periods	Reconnaissance
	Black Mountain Creek	905	1	BMC2 GPS 33.0737.4N 116.4813.0W Good site for reference conditions.	February April May/June Sep/Oct	October 02
	Lusardi Creek	905.11	1	LSR1 GPS 33.0033N 117.0956W The Environmental Trust Property – access via Artesian Road.	February April May/June Sep/Oct	October 02
	Santa Ysabel Creek	905.32	1	YSA3 GPS 33.0739.5N 116.4042.5W At Hwy 79 crossing. Riffles upstream and downstream of bridge. Past heavy grazing impacts. Nature Conservancy new owner (2000). Just above confluence with Dulzura	February April May/June Sep/Oct	October 02
	San Dieguito River	905.10	1	SDI5 San Dieguito River Mouth. Locate site in 2002.	February April May/June Sep/Oct	October 02
		Subtotal	4			
	Total		11	* = See San Diego Bioassessment Reference Site for details		

Sampling Design: Tiered
Major Parameters: Physicochemical, Conventional Water Chemistry (Metals, Nutrients, Pesticides), Bioassessment, Aquatic Toxicity, Sediment Toxicity, TSM.
Partners: Santa Margarita River Watershed Monitoring Framework, City of San Diego, County of San Diego, County of Riverside, Mission Resource Conservation District (RCD), San Diego County Water Authority, San Dieguito Municipal Water District, Tribes (?).
NPDES Permit Coverage? Yes
Other Programs: TSMP, Coastal Fish.

SWAMP Year 1 (FY 2000-01)	Rain Year Sampled 2001-02
Los Penasquitos Watershed	**(5 Stations)**
Los Penasquitos Creek	1
Tecolote Creek	1
Rose Creek	1
Poway Creek (Alternate)	1
Soledad Canyon Creek	1
Carlsbad Watershed	**(10 Stations)**
Escondido Creek	2
Loma Alta Creek	1
San Marcos Creek	2
Encinitas Creek	1
Cottonwood Creek	1
Aqua Hedionda Creek	1
Buena Vista Creek	1
Buena Creek	1

Sampling Design: Fully Integrated.
Major Parameters: Physicochemical, Conventional Water Chemistry (Metals, Nutrients, Pesticides), Bioassessment, Aquatic Toxicity, Sediment Toxicity, TSM.
Partners: None.
NPDES Permit Coverage? Yes
Other Programs: TSMP, Coastal Fish, Ambient Bioassessment Monitoring Program.

SWAMP Year 2 (FY 2001-02)	**Rain Year Sampled 2002-03**
San Juan Watershed	**(21 Stations)**
Wood Canyon Creek	1
Aliso Creek	2
San Juan Creek	1
Arroyo Trabuco	2
Oso Creek	1
Bell Canyon Creek	1
Crow Canyon	1
Canada Goberandora	1
Canada Chiquita	1
San Mateo Creek	2
Laguna Canyon Creek (alternate)	2
Moro Canyon Creek (alternate)	1
Sulpher Creek (alternate)	1
Salt Creek (alternate)	1
San Mateo Creek (alternate)	1
San Onofre Canyon Creek (alternate)	1
Christianitos Creek (alternate)	1
Otay Watershed	**(10 Stations)**
Jamul Creek	1
Dulzura Creek	1
Hollenbeck Canyon Creek	1
Telegraph Canyon Creek (alternate)	1
Otay River (alternate)	1
Pringle Canyon Creek (alternate)	1
Jamul Creek (alternate)	1
Salt Creek (alternate)	1
Poggi Canyon Creek (alternate)	1
Proctor Valley Creek (alternate)	1

Sampling Design: Fully Integrated
Major Parameters: Physicochemical, Conventional Water Chemistry (Metals, Nutrients, Pesticides), Bioassessment, Aquatic Toxicity, Sediment Toxicity, TSM.
Partners: City of San Diego, County of San Diego, County of Orange, Otay Water District.
NPDES Permit Coverage? Yes
Other Programs: TSMP, Coastal Fish, Ambient Bioassessment Monitoring Program.

SWAMP Year 3 (02/03)	**Rain Year Sampled (03/04)**
Santa Margarita Watershed	**(7 Stations)**
San Dieguito River Watershed	**(4 Stations)**
See Table above for details	

SWAMP Year 4 (03/04)	Rain Year Sampled (04/05)
San Luis Rey River Watershed	**(13 Stations)**
San Luis Rey River	3
Gopher Canyon Creek	1
Keys Creek	1
West Fork San Luis Rey River	1
Pilgrim Creek	1
Gird Creek	1
Moosa Creek	1
Pauma Creek (Alternate)	1
San Ysidro Creek	1
Carrizo Creek	1
San Diego River Watershed	**(13 Stations)**
San Diego River	3
Conejos Creek	1
Flinn Springs Creek	1
San Vicente Creek	1
Alvarado Creek	1
Forrester Creek	1
Boulder Creek	1
Kelly Creek	1
Cedar Creek	1
Chocolate Creek	1
Alpine Creek	1

Sampling Design: Tiered
Major Parameters: Physicochemical, Conventional Water Chemistry (Metals, Nutrients, Pesticides), Bioassessment, Aquatic Toxicity, Sediment Toxicity, TSM.
Partners: City of San Diego, Mission RCD, Vista Irrigation District, USFS, and Tribes (?).
NPDES Permit Coverage? Yes
Other Programs: TSMP, Coastal Fish.

SWAMP Year 5 (04/05)	Rain Year Sampled (05/06)
Tijuana River Watershed	**(12 Stations)**
Cottonwood Creek	2
Tijuana River	2
Pine Creek	1
Scove Creek	1
Troy Creek	1
La Posta Creek	2
Kitchen Creek	1
Campo Creek	1
Potrero Creek	1
San Diego Bay Watershed	**(10 Stations)**
Sweetwater River	4
Cold Creek	1
Lawson Creek	1
Harbinson Canyon Creek	1
Taylor Creek	1
Harper Creek	1
Descanso Creek	1

Sampling Design: Tiered
Major Parameters: Physicochemical, Conventional Water Chemistry (Metals, Nutrients, Pesticides), Bioassessment, Aquatic Toxicity, Sediment Toxicity, TSM, Mussel Watch Parameters.
Partners: City of San Diego, Sweetwater Authority, USFS, and Tribes (?)
NPDES Permit Coverage? Yes
Other Programs: TSMP, Coastal Fish, Mussel Watch.