

County of San Diego Copermittees
Regional Receiving Waters and Urban Runoff Monitoring and Reporting Program
2009-2010 Monitoring Season Activities

Purpose and Objectives

The purpose of this document is to provide a comprehensive description of activities that will be completed during the 2009-2010 monitoring year by the County of San Diego Copermittees to comply with the Receiving Waters and Urban Runoff Monitoring and Reporting Program Number R9-2007-0001 (Order). Permit year three (October 1, 2009 through September 30, 2010) of the Order is being used as the basis for these activities. Monitoring will primarily occur in the southern section of San Diego County as outlined in Table 1 of the Order. The specific objectives of this monitoring program as stated in the Order and as it applies to this scope of services are intended to meet the following goals:

1. Assess compliance with Order No. R9-2007-0001;
2. Measure and improve the effectiveness of the Copermittees' urban runoff management programs;
3. Assess the chemical, physical, and biological impacts to receiving waters resulting from urban runoff discharges;
4. Characterize urban runoff discharges;
5. Identify sources of specific pollutants;
6. Prioritize drainage and sub-drainage areas that need management action;
7. Detect and eliminate illicit discharges and illicit connections to the MS4;
8. Assess the overall health of receiving waters.

In addition, this program is designed to answer the following core management questions:

1. Are conditions in receiving waters protective, or likely to be protective, of beneficial uses?
2. What is the extent and magnitude of the current or potential receiving water problems?
3. What is the relative urban runoff contribution to the receiving water problem(s)?
4. What are the sources of urban runoff that contribute to receiving water problem(s)?
5. Are conditions in receiving waters getting better or worse?

To accomplish the goals above:

- Monitoring occurs on a rotating schedule in the north and south portions of the County on an annual basis. The temporary watershed assessment stations (TWAS) are located upstream of the historical mass loading stations (MLS) and will allow for better spatial coverage of each watershed. The 2009-2010 monitoring of MLS and TWAS occurs in the southern watershed management areas (Mission Bay/La Jolla, San Diego River, San Diego Bay, and Tijuana River).
- Continued implementation of a monitoring and reporting program that allows for determination of annual and long-term trends of ecological health in receiving waters of the County based upon chemical, physical, and biological evidence. This program is designed to facilitate watershed-based assessments.

- Implement a program that assesses compliance with Regional Water Quality Control Board (RWQCB) Order No. R9-2007-0001.

Relevant sub-objectives include:

- Continued implementation of a phased and scientifically based program that provides mechanisms for identifying potential problems.
- Continued implementation of an adaptive approach that provides the data necessary to answer specific questions, or that can eliminate redundancy.
- Continued implementation of a program that measures the effectiveness of Urban Runoff Management Plans and other pollutant reduction strategies.
- Continued implementation of a program that integrates with other regional programs involved in assessing the overall health of receiving water in San Diego County and Southern California.

OUTLINE OF ACTIVITIES

The 2009-2010 monitoring year includes the following broad activities from the Core Receiving Waters Monitoring Program Section of the Order and from the Regional Monitoring workgroup meetings. Details of each activity are provided in the following pages. Activities identified are in the same order as presented in the Order.

Mass Loading Station and Temporary Watershed Assessment Station Monitoring

Monitoring will be conducted at Mass Loading Stations (MLS) and Temporary Watershed Assessment Stations (TWAS). Activities include identifying suitable locations and installing nine TWAS. The TWAS will be located upstream from the MLS in strategic locations designed to improve the understanding of where constituent loadings are occurring.

Chemical, bacteriological, and toxicity testing of dry weather (ambient) flows from five MLS and nine TWAS located within the southern watersheds of San Diego County including one MLS in Chollas Creek (total of 14 sites) as indicated in Table 1 of the Order. Wet weather monitoring will occur during the first rainfall event on or after October 1, 2009 and during one monitoring event after February 1, 2010. Trash assessments will be conducted at each site in accordance with the Monitoring Workplan for the Assessment of Trash in San Diego County. Dry weather monitoring will occur in fall 2009 and in spring 2010. The spring 2010 dry weather monitoring will coincide with the stream bioassessment task listed below in Activity #2.

Sediment samples will be collected within two weeks following the first storm of the season from five MLS and nine TWAS located within the southern watersheds of San Diego County (total of 14 sites). These samples will be analyzed for synthetic pyrethroids, total organic carbon, and grain size distribution. Samples will be collected in accordance with the Monitoring Workplan for the Assessment of Synthetic Pyrethroids in San Diego County.

Bioassessment Monitoring and 2010 SMC Monitoring Program

In accordance with Addendum No. 2 to Order R9-2007-0001, stream bioassessment surveys will occur at 14 stations and 3 reference stations during spring 2010. The Copermittees will also participate in the Storm Water Monitoring Coalition (SMC) spring 2010 Monitoring Program in lieu of conducting the fall 2009 Bioassessment Monitoring Program.

Bioassessment surveys will coincide with the spring dry (ambient monitoring) event described above in Activity #1. Benthic macroinvertebrates and physical habitat data will be collected following the *Surface Water Ambient Monitoring Program (SWAMP) Standard Operating Procedures for Collecting Benthic Macroinvertebrates and Associated Physical and Chemical Data* (Ode 2007) using the reach-wide benthos method. Benthic algae (periphyton) monitoring will be conducted in accordance with the *Draft SWAMP Reachwide Benthos Method for Stream Algae Sampling and Associated Physical Habitat Data Collection. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 00X* (Fetscher et al., 2009). Samples will be collected and processed for ash-free dry mass (AFDM), chlorophyll-A analysis, and periphyton taxonomy. Reach-wide algal cover will be quantified as part of the SWAMP physical habitat assessment.

The SMC Monitoring will be conducted following the protocols developed by the SMC Bioassessment Technical Workgroup. This program will be conducted throughout southern California and is anticipated to be included in future National Pollution Discharge Elimination System (NPDES) Permits. Twenty-four stations are scheduled for monitoring in San Diego County. The San Diego RWQCB has committed to sampling 8 stations. The Copermittees of San Diego have committed in the 2009-2010 monitoring season to sample the remaining 16 stations. Water quality monitoring, toxicity testing, and bioassessment monitoring will be conducted in accordance with the SMC Final Monitoring Workplan and Quality Assurance Program Plan developed during spring 2009.

Toxicity Identification Evaluations (Follow-Up Analysis and Actions)

Toxicity Identification Evaluations (TIEs) will be used to determine the causative agent of toxicity based on the Triad Approach to determining follow up actions. Currently, data do not support conducting TIEs in the southern sites with the exception of Tijuana River and Chollas Creek. These two sites have had TIEs conducted previously and the causative agents of toxicity have been identified. The Copermittees have budgeted for three full phase I TIEs in the event significant toxicity is observed at a new TWAS during more than one event for the same species.

Confirmatory TIEs performed for Chollas Creek to confirm toxicity to *H. azteca* have shown that synthetic pyrethroids were the causative agent of toxicity during the 2005-06 and 2006-07 monitoring seasons. The Copermittees will not perform additional TIEs in Chollas Creek under the regional monitoring program at this time as no significant changes in the watershed have recently occurred.

Ambient Bay and Lagoon Monitoring

Ambient Bay and Lagoon Monitoring (ABLM) will be conducted as a special study in accordance with goals listed in the Order and in the May 3, 2007 letter from the RWQCB (SWPU: 10-5000.03: bussel). The Copermittees have addressed these requirements by assessing

the data collected to date and by developing a monitoring program that builds on recent lagoon monitoring program data.

During summer 2010, the Copermittees will conduct the ABLM Program in Agua Hedionda Lagoon. Samples will be collected from 12 sediment stations and 4 water quality stations in accordance with the 2010-2012 Ambient Bay and Lagoon Monitoring Workplan. Samples collected from sediment locations will be analyzed for sediment chemistry, sediment toxicity, and benthos for the purpose of assessing the data with respect to the recently developed Sediment Quality Objective Guidelines for Enclosed Bays and Estuaries. Water quality samples will be collected from four stations and analyzed for chemistry and physical parameters.

The sampling design was developed to answer two specific questions as follows:

1. To determine the stressors (both natural and anthropogenic) that influences the distribution of benthic organisms.
2. To determine the stressors (both natural and anthropogenic) that contributes to amphipod toxicity.

Coastal Storm Drain Monitoring

The Coastal Storm Drain Monitoring Program is conducted by the coastal Copermittees. The Coastal Monitoring Program Workplan details their specific activities and was submitted with the Scope of Work for Monitoring Activities for 2008-2009.

Synthetic Pyrethroid Monitoring

Synthetic pyrethroid monitoring elements will be conducted in accordance with the Monitoring Workplan for the Assessment of Synthetic Pyrethroids in San Diego County and included in the Scope of Work for Monitoring Activities for 2007-2008. Post storm sediment samples will be collected from the southern MLS and TWAS locations within two weeks following the first flush storm event. Synthetic pyrethroids are also analyzed during the wet weather water quality monitoring at the MLS and TWAS.

MS4 Outfall Monitoring

MS4 outfall monitoring will be conducted in accordance with the Municipal Separate Storm Sewer System (MS4) Outfalls Monitoring Program in San Diego County Watershed Management Areas Workplan. Activities include conducting wet weather and dry weather random sampling and wet weather and dry weather targeted sampling within each of the nine watershed management areas.

Under the wet weather and dry weather random sampling program, the Copermittees plan to collect 54 wet and 54 dry samples to be analyzed for chemistry and microbiology parameters. Six samples per WMA will be collected during wet events and six samples per WMA will be collected during dry events within each of the nine watershed management areas (total of 54 wet and 54 dry per year).

Wet weather targeted sampling will occur at three separate watershed stations during one wet weather event. Pollutographs sampling will be conducted for chemical, physical, and microbiology parameters. Dry weather targeted sampling will be conducted by individual

jurisdictions during summer 2010. Samples will be analyzed for the priority water quality problem constituents specific to the WMA being sampled.

Source Identification Program Implementation

Source Identification monitoring will be conducted in accordance with the Urban Runoff Source Identification Program in San Diego County Watersheds Workplan. The focus of the 2009-2010 Source Identification Study is to assess the condition of wet weather runoff from single family residential land uses. This data will be useful for providing land use specific information for future TMDL development and assessment. The study will also build on the information collected from the dry weather residential source identification study conducted during the 2008-2009 monitoring season. Samples will be collected from 2 locations as pollutograph samples and analyzed for chemical, physical, and microbiology parameters.

Dry Weather Field Screening and Analytical Monitoring

As part of its Jurisdictional Urban Runoff Urban Management Program (JURMP), each Copermittee conducts dry weather field screening and analytical monitoring that includes follow-up investigations as needed. The Copermittees voluntarily coordinate many aspects of this program through the Copermittees Dry Weather Monitoring Workgroup.

Bight 08

The Copermittees participated in the Southern California Bight 2008 Regional Monitoring Program (Bight 08) during the 2008-2009 monitoring season. However, the Microbiology Regrowth Study was delayed due to unexpected delays in executing a contract. However, the contract has just been executed and the project will commence at the close of the 2009-2010 rainy season in spring 2010 (details of the Microbiology Regrowth Study are provided in Appendix A).

TMDL Monitoring

All monitoring shall be conducted as required in Investigation Order No. R9-2004-0277 for Chollas Creek. The Chollas Creek Watershed Copermittees have worked collaboratively to develop the Chollas Creek Dissolved Metals TMDL Implementation Plan. The monitoring plan developed under this program includes addressing the analytes required by Order No. R9-2004-0277 and includes special studies for assessing the jurisdictional boundaries, synthetic pyrethroids, metals source identification sites, and microbiology.

Regional Harbor Monitoring

The Regional Harbor Monitoring Program (RHMP) is implemented by a subset of Copermittees who have committed to continue implementing the program.

Monitoring Reporting

A report of results, data analysis, and findings from the 2009-2010 monitoring program will be presented to comply with the Order reporting requirements of Section III.A. The final annual report will be submitted to the SDRWQCB to meet the January 31, 2011 due date.

DETAILS OF ACTIVITIES

Additional details where warranted are provided in the following pages.

RECEIVING WATERS MONITORING

Mass Loading Station and Temporary Watershed Assessment Station Monitoring

Season Mobilization and Demobilization of MLS/TWAS Monitoring Stations

- MLS and TWAS will be installed and maintained to perform flow monitoring and sampling during the monitoring year (September 1-June 30).
- Site location planning and installation of Temporary Watershed Assessment Stations (TWAS).
- Flow monitoring data will be collected throughout the monitoring season for the purpose of estimating annual watershed loads.

Stream Ratings

Stream ratings will be performed using USGS stream rating techniques. Where necessary, MLS and TWAS channels will be surveyed and rating curves will be developed using appropriate flow equations. During wet weather monitoring events, flow rates will be measured using an acoustic doppler current profiler (ADCP), where conditions allow, to calibrate the upper range of the rating curve for each site. Ratings curves may require periodic validation or re-calibration based on channel dimensions that may shift due to channel bed erosion or deposition throughout the year. Regular station maintenance activities include periodic stream ratings.

Water Quality Monitoring at 5 Mass Loading Stations (MLS) and 9 Temporary Watershed Stations (TWAS) During Dry Weather (Ambient) Flow Events

- Event Mobilization and Demobilization
- Dry Weather Event Field Monitoring
- Dry Weather Event Chemistry Analyses
- Dry Weather Event Microbiology Analyses
- Dry Weather Event Toxicity Analyses
- Dry Weather Event Data Management and Report QA

Each MLS and TWAS will be monitored twice during the monitoring period for dry weather flow per the Order. This monitoring is performed on a rotating schedule in accordance with Table 1 of the Order. Dry weather monitoring events will occur during September or October of 2009 and May or June of 2010 at the following MLS sites (historical site locations will be used):

- Tecolote Creek
- San Diego River
- Chollas Creek
- Sweetwater River

- Tijuana River

In the event that flow is not observed during the fall 2009 and spring 2010 monitoring events, and if flow is observed during the wet weather season, sampling will occur during non storm events (e.g. > 72 hours after a storm event).

A total of nine TWAS will be sited and installed in the following waterbodies:

- Rose Creek (1 site)
- Tecolote Creek (1 site)
- San Diego River (3 sites)
- Sweetwater River (1 site)
- Otay River (1 site)
- Tijuana River (2 sites)

A summary of the site locations and the rationale for their selection are provided in Table 1 for the MLS and Table 2 for the TWAS. **Error! Reference source not found.**

Table 1. List of Mass Loading Station Locations for the 2009-2010 Monitoring Year

Watershed	Station ID	Latitude	Longitude	Cross Street Description	Land Use Description	Notes	Channel Type
Tecolote Creek (Mission Bay WMA)	TC-MLS	32.7729332	-117.203064	Moreno Blvd. Bridge just north of Tecolote Rd.	Primarily residential.	Historical Monitoring Site	Concrete Channel
San Diego River	SDR-MLS	32.7652404	-117.168617	West Fashion Valley Rd. Footbridge near the trolley station. Just east of Fashion Valley Rd.	Residential, commercial, parks, and open space	Site is collocated with the USGS gaging station at Fashion Valley. For the 2009-2010 Season, this site was moved approximately 85 meters upstream to Steel Street due to sedimentation issues at the historical site at Durant Street.	Natural Channel
Chollas Creek (San Diego Bay WMA)	CC-SD8(1)	32.7048179	-117.120963	At the end of Steel Street just south of 33rd St.	Primarily residential, commercial, industrial, and transportation		Concrete Channel
Sweetwater River (San Diego Bay WMA)	SR-MLS	32.6507197	-117.063592	At Plaza Bonita Rd Bridge just south of Equitation Ln.	Parks and residential.	Historical Monitoring Site	Natural Channel
Tijuana River	TJR-MLS	32.5513062	-117.08405	Hollister Street Bridge between Sunset and Monumne Road.	Rural Residential, residential, agriculture, open space, and some industrial.	The current monitoring location is on the main stem where flow are observed. This is a very large floodplain and can flood during high rainfall totals. Flows bypassing the IWBC Treatment Plant are recorded by IWBC and this MLS site.	Natural Channel

Table 2. List of Temporary Watershed Locations for the 2009-2010 Monitoring Year

Watershed	Station ID	Latitude	Longitude	Cross Street	Land Use Description	Notes and Rationale	Channel Type
Mission Bay	MB-TWAS-1	32.81719	-117.2236	Where Sante Fe St. Bridge crosses Rose Creek	Primarily residential, open space, and public utilities	Site was moved 1600 yds south due to site safety conditions. This TWAS provides additional spatial data for Mission Bay Watershed. Site captures both Rose Canyon and San Clemente Canyon	Natural Channel
Mission Bay	MB-TWAS-2	32.797806	-117.189378	Just south of Mount Acadia Blvd. and Snead Ave. intersection.	Primarily residential.	This TWAS provides upstream data for comparison to MLS. Site is upstream from Tecolote Canyon Golf Course	Natural Channel
San Diego River	SDR-TWAS-1	32.78349	-117.10412	San Diego Mission Road Bridge	Residential, parks, and open space	Site will capture upstream influences to compare to other TWAS and MLS. Site was moved downstream ~1250 yds from original location	Natural Channel
San Diego River	SDR-TWAS-2	32.839194	-117.024194	West Hills Parkway Bridge just north of Mission Gorge Road	Primarily residential, commercial and industrial, and open space.	Site will capture upstream influences to compare to other TWAS and MLS. Site was moved downstream due to original site constraints and at request of SDR WURMP Group to move site to West Hills Parkway. Also has a USGS Gaging Station	Natural Channel
San Diego River	SDR-TWAS-3	32.856961	-116.947551	Just west of Riverford Road Bridge and north of Woodside Ave. intersection.	Open space, residential, and commercial.	Site appears that there may be sediment basins and diversions in areas near river. Local jurisdictional input is needed to verify site. Possible influences from construction activities will be measured in analytical results	Natural Channel
Sweetwater River (San Diego Bay)	SR-TWAS-1	32.73272	-116.9399	Just east of Steel Canyon Bridge and south of Campo Road and Singer Ln.	Parks and residential.	This TWAS provides upstream data for comparison to MLS.	Natural Channel
Otay River (San Diego Bay)	OR-TWAS-1	32.589957	-117.084052	Otay River at the Hollister Creek @ Campo Creek	Residential, commercial, some industrial, and open space.	The Port has indicated they prefer furthest downstream location above tidal prism. This site appears to be most favorable location from the most recent site visits.	Natural Channel
Tijuana River	TJ-TWAS-1	32.60939	-116.47421	Highway 94 just north of the railroad crossing and across from the Stone Building Museum	Rural Residential, residential, agriculture, open space, and some industrial.	This TWAS provides data on the east county community of Campo.	Natural Channel
Tijuana River	TJ-TWAS-2	32.55131	-117.083389	Tijuana River @ Hollister Street just upstream of current Wet Weather Mass Loading Station (TB 1350 B4).	Residential, commercial, some industrial, and open space.	This TWAS provides data on the Tijuana River on the US side of the boarder. During periods of low flow the river is diverted through the International Boundary and Water Commission's	Natural Channel

The MLS and TWAS monitoring will occur in a similar time frame within each watershed to assess the spatial distribution of monitored parameters.

MLS are co-located with United States Geological Survey (USGS) flow monitoring stations where possible. Field personnel will measure the flow rate of streams at stations that are not rated using USGS stream profiling guidelines during the installation of each monitoring station, and in the event of major observed changes in the channels that have occurred during or after the storm season. This will be accomplished by manual rating techniques using a hand held flow meter. The resulting discharge rate will be used to calculate a discharge equation which will be utilized by the flow monitoring equipment.

Flow rates will be monitored using American Sigma flow meters with an ultrasonic sensor, bubbler, or submerged pressure transducer as the primary measuring device. The primary sensor will continuously measure stage (stream height) and relay that information to the flow meter. The flow meter will continually calculate flow rates by inserting the stage information into the preprogrammed discharge equation. Using this system the flow meter will be able to actuate the American Sigma 900 series sampler to achieve a flow weighted composite sample. Sampling and flow equipment will be monitored remotely and all data will be transferred to a permanent data system via land-line or cellular telephone.

All sampling and analyses conducted for MLS or TWAS will be in accordance with applicable USEPA regulation and guidance as summarized in Table 3. One flow-weighted composite will be collected by autosampler and field personnel will collect one grab sample. Flow weighted composite samples will be collected during representative flow conditions. A minimum of 3 sample aliquots will be collected, spaced at least 15 minutes apart, per the Order. Trash assessments will be conducted at each site in accordance with the Monitoring Workplan for the Assessment of Trash in San Diego County (Weston, 2007). A revised trash assessment field form is provided in Appendix B.

The dry weather monitoring will occur once during the fall of 2009 and once during the spring of 2010. Flow-weighted composite samples will be collected and will be analyzed for the following parameters:

Inorganic chemicals – Ammonia, total and dissolved organic carbon, total and dissolved phosphorus, nitrate, nitrite, total hardness, TKN, TDS, TSS, Turbidity, MBAS, COD

Metals (Total Metals and Dissolved Metals) – Antimony, Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Zinc

Organophosphate pesticides – Diazinon, Chlorpyrifos, Malathion

Toxicity Testing – Conduct toxicity testing at each station using *Ceriodaphnia dubia* (acute and chronic), *Selenastrum capricornutum* (chronic), and *Hyaella azteca* (acute).

Organics – (Chollas Creek only) for PCBs, PAHs, and Chlordane to comply with section II.A.1.h of the Order.

The grab sample will be analyzed for the following parameters:

Field measurements of grab samples shall include temperature, pH, and specific conductance.

Laboratory measurements shall be conducted on grab samples for BOD, oil and grease, total coliform, fecal coliform, and enterococcus.

The MLS and TWAS equipment installed and monitored for dry weather will remain in place during the course of the wet weather season. Continual flow data will be downloaded remotely from each site on a bi-weekly basis to provide a better understanding of flow estimates for constituent loading information and to verify equipment functionality to reduce data gaps. Equipment will be maintained throughout this period to ensure it is in proper working order.

Water Quality Monitoring at 5 Mass Loading Stations (MLS) and 9 Temporary Watershed Stations (TWAS) During Wet Weather Flow Events

- Wet Weather Event Activation, Mobilization/Demobilization, and Maintenance
- Wet Weather Event Field Monitoring
- Wet Weather Event Chemistry Analyses
- Wet Weather Event Microbiology Analyses
- Wet Weather Event Toxicity Analyses
- Wet Weather and Dry Weather Event Data Management and Report QA

Each MLS and TWAS must be monitored twice during the wet weather monitoring season (defined as October 1st through April 30th) per the Order. The MLS and TWAS must be monitored and sampled during the first viable rainfall event of the monitoring season and one rainfall event after February 1st. A viable storm event is considered a minimum of 0.1 inch of rainfall. Each storm of at least 0.1 inch of rainfall must be separated by a minimum of 72 hours of rainfall, and the forecasted storm volume must be within $\pm 50\%$ of the average storm volume and duration for the region. This monitoring is also performed on a rotating schedule in accordance with Table 1 of the Order. This task complies with monitoring year three of the permit cycle. Monitoring will be performed at the preexisting stations established during the dry weather monitoring events outlined in Task #1 above.

The five MLS sites are within the following waterbodies:

- Tecolote Creek
- San Diego River
- Chollas Creek
- Sweetwater River
- Tijuana River

A total of nine Temporary Watershed Assessment Stations (TWAS) will also be monitored in the following waterbodies:

- Rose Creek (1 site)
- Tecolote Creek (1 site)
- San Diego River (3 sites)
- Sweetwater River (1 site)

- Otay River (1 site)
- Tijuana River (2 sites)

The MLS and TWAS monitoring will occur within the same relative time frame within each waterbody to assess the spatial variation of the distribution of monitored parameters.

Monitoring stations are co-located with United States Geological Survey (USGS) flow measuring stations where possible. Field crews will measure the flow rate of streams at stations that are not rated using USGS stream profiling guidelines prior to the beginning of the storm season, and in the event of major observed changes in the channels during the storm season. This will be accomplished by manual rating techniques using a hand held flow meter. The resulting discharge rate will be used to calculate a discharge equation which will be utilized by the flow monitoring equipment.

Flow rates will be monitored using American Sigma flow meters with an ultrasonic sensor, bubbler, or submerged pressure transducer as the primary measuring device. The primary sensor will continuously measure stage (stream height) and relay that information to the flow meter. The flow meter will continually calculate flow rates by inserting the stage information into the preprogrammed discharge equation. Using this system, the flow meter will be able to actuate the American Sigma 900 series sampler to achieve a flow weighted composite sample. Sampling and flow equipment will be monitored remotely and all data will be transferred back to a permanent monitoring database via land-line or cellular telephone.

All sampling and analyses conducted for the MLS/TWAS will be in accordance with applicable USEPA regulation and guidance as summarized in Table 3. One flow-weighted composite will be collected by auto sampler and field personnel will collect one grab sample.

The flow-weighted composite will be analyzed for the following parameters:

Inorganic chemicals – Ammonia, total and dissolved organic carbon, total and dissolved phosphorus, nitrate, nitrite, total hardness, TKN, TDS, TSS, Turbidity, MBAS, COD

Metals (Total Metals and Dissolved Metals) – Antimony, Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Zinc

Organophosphate pesticides – Diazinon, Chlorpyrifos, Malathion

Synthetic Pyrethroids – Allethrin, Bifenthrin, Cyfluthrin, Cypermethrin, Danitol, Deltamethrin, L-Cyhalothrin, Permethrin, and Prallethrin.

Toxicity Testing – Conduct toxicity testing at each station using *Ceriodaphnia dubia* (*acute and chronic*), *Selenastrum capricornutum* (*chronic*), and *Hyaella azteca* (*acute*).

Organics – (Chollas Creek only) for PCBs, PAHs, and Chlordane to comply with section II.A.1.h of the Order.

The grab sample will be analyzed for the following parameters:

Field measurements shall be performed on grab samples for temperature, pH, and specific conductance.

Laboratory measurements shall be conducted on grab samples for BOD, oil and grease, total coliform, fecal coliform, and enterococcus.

Field observations including trash assessments will be performed at each site in accordance with the Monitoring Workplan for the Assessment of Trash in San Diego County (Weston, 2007).

Table 3. Analytical Requirements for Mass Loading Stations.

Constituent	Volume Required	Method	Target Reporting Limit	Units	Max Holding Time
General Physical and Inorganic Non-Metals					
Total Dissolved Solids (TDS)	100 ml	SM 2540C	20	mg/l	7D
Total Suspended Solids (TSS)	100 ml	SM2540D	20	mg/l	7D
Turbidity	100 ml	SM 2130A-B	0.1	NTU	48H
Total Hardness	150 ml	SM 2340B	10	mg/l	6M
pH	In field	EPA 150.1	0.1	S.U.	-
Specific Conductance	In field	SM 2510B	1	umhos/cm	-
Temperature	In field	Meter	-	-	-
Dissolved Phosphorus	250 ml	SM 4500PE	0.05	mg/l	48H
Total Phosphorus	250 ml	SM 4500PE	0.05	mg/l	28D
Nitrate	200 ml	SM4500NO3E	0.1	mg/l	48H
Nitrite	200 ml	SM4500NO2B	0.05	mg/l	48H
Total Kjeldahl Nitrogen (TKN)	500 ml	SM4500C	0.1	mg/l	28D
Ammonia	250 ml	SM 4500NH3D	0.1	mg/l	28D
Biological Oxygen Demand, 5-day (BOD)	1000 ml	SM5210B	2	mg/l	48H
Chemical Oxygen Demand (COD)	25 ml	EPA 410.4	25	mg/l	28D
Total Organic Carbon (TOC)	125 ml	SM 5310 B	1	mg/l	28D
Dissolved Organic Carbon (DOC)	125 ml	SM 5310 B	1	mg/l	28D
Organics					
Oil and Grease (O&G)	500 ml	EPA 1664	5	mg/l	14D
Diazinon	1 liter	EPA 625	0.05	ug/l	14D
Chlorpyrifos	1 liter	EPA 625	0.05	ug/l	14D
Malathion	1 liter	EPA 625	0.05	ug/l	14D
Synthetic Pyrethroids	1 liter	GC/MS NCI Mode	0.005	ug/l	7 D
Methylene Blue Active Substances (MBAS)	250 ml	SM 5540C	1	mg/l	48H
Chollas Creek Only (Additional Methods)	-	-	-	-	-
Polychlorinated Biphenyls (PCBs)	1 liter	EPA 625	0.020	ug/l	14D
Chlordane	1 liter	EPA 625	0.005	ug/l	14D
Polycyclic Aromatic Hydrocarbons (PAHs)	1 liter	EPA 625	0.10	ug/l	14D
Metals, Total + Dissolved					
Antimony (Sb)	75 ml	EPA 200.8	0.002	mg/l	6M
Arsenic (As)	75 ml	EPA 200.8	0.001	mg/l	6M
Cadmium (Cd)	75 ml	EPA 200.8	0.001	mg/l	6M
Chromium (Cr)	75 ml	EPA 200.8	0.005	mg/l	6M
Copper (Cu)	75 ml	EPA 200.8	0.001	mg/l	6M
Lead (Pb)	75 ml	EPA 200.8	0.001	mg/l	6M
Nickel (Ni)	75 ml	EPA 200.8	0.002	mg/l	6M
Selenium (Se)	75 ml	EPA 200.8	0.002	mg/l	6M
Zinc (Zn)	75 ml	EPA 200.8	0.02	mg/l	6M
Bacteriological					
Total Coliform	200 ml	SM 9221B	*	MPN/100ml	6H
Fecal Coliform	200 ml	SM9221E	*	MPN/100ml	6H
Enterococcus	200 ml	SM 9230	*	MPN/100ml	6H
Toxicity	10 Liters				
96-hr acute and 7-day chronic and reproductive test with the cladoceran <i>Ceriodaphnia dubia</i>					
Chronic test with the freshwater algae <i>Selenastrum capricornutum</i>					
96-hr acute survival test with the amphipod <i>Hyaella azteca</i> .					

* To 6 dilutions – results will be reported as a number not as a greater than value

Bioassessment Monitoring, Benthic Algae (Periphyton) Monitoring, and SMC Monitoring Program Participation

Bioassessment monitoring will be conducted pursuant to SWAMP procedures as specified by the SMC Workplan (Appendix C) to provide a measure of stream health.

During the bioassessment surveys, benthic algae (periphyton) monitoring will be conducted in accordance with the SWAMP benthic algae protocol.

The following procedures will be used for Site Sampling and Analysis:

- Collect and analyze substrate samples for benthic macroinvertebrates (BMI) from each of 14 bioassessment monitoring stations and three reference stations. Station locations will be collocated with the MLS and TWAS where feasible but may be moved between sampling events depending on the physical conditions of the site (e.g. wet versus dry). Field measurements of pH, temperature, dissolved oxygen, conductivity, flow rate, percent gradient, sampling area physiography, and overall assessment of physical habitat (e.g., vegetative cover, bank stability, and other relevant observations) will be obtained at each station.
- Collect and analyze substrate samples for benthic algae from each of 14 bioassessment monitoring stations and three reference stations. Field surveys will be performed in conjunction with, and at the same locations as the benthic macroinvertebrate stations. Samples will also be collected and analyzed for chlorophyll-A and ash free dry mass (AFDM), and reach-wide algal cover will be quantified.

The surveys will occur from late April through July 15 of 2010 following the wet weather monitoring period and at least four weeks after the last scouring rain event. The surveys will be performed in coordination with the spring dry weather (ambient) monitoring events in order to compare water quality results with the bioassessment results.

Stations will be distributed to cover each of the four southern watershed management areas in San Diego County in accordance with Table 1 of the Order.

Hydrologic conditions permitting, the following water bodies will be sampled at the following locations (upstream/downstream):

- Rose Creek (1 site)
 - Tecolote Creek (2 sites)
 - San Diego River (4 sites)
 - Chollas Creek (1 Site)
 - Sweetwater River (2 sites)
 - Otay River (1 site)
 - Tijuana River (3 sites)
- BMI samples will be analyzed pursuant to the SMC procedures. Periphyton Taxonomy will be performed by Rosalina Stancheva of California State University- San Marcos. Chlorophyll-A and AFDM will be analyzed by CRG Marine Laboratories, Inc.

- A 10% quality assurance check will be performed on benthic invertebrate taxonomic identification by the CDF&G Aquatic Bioassessment Laboratory.
- Sample data from all bioassessment monitoring stations in the receiving waters of the Copermittees will be analyzed. Multimetric assemblage analyses will be conducted simultaneously to analyze all of the populations of benthic invertebrates to provide a relative assessment of ecological health. Bioassessment data analysis will include the calculation of the Index of Biotic Integrity (IBI) for benthic macro invertebrates for all bioassessment stations as outlined in “A Quantitative Tool for Assessing the Integrity of Southern California Coastal Streams” by Ode et al., 2005.
- The Bioassessment Program will be performed in accordance with the minimum SWAMP protocols as required by the Order.

The SMC Regional Monitoring Program will be conducted following the protocols being developed by the SMC Bioassessment Technical Workgroup. This program will be conducted throughout southern California and is anticipated to be included in future National Pollution Discharge Elimination System (NPDES) Permits. Twenty-four stations are scheduled for monitoring in San Diego County (Year 2 of the SMC Regional Monitoring Program). The San Diego RWQCB has committed to sample 8 stations. The Copermittees of San Diego have committed to sample the remaining 16 stations. Water quality monitoring, toxicity testing, and bioassessment monitoring are planned in accordance with the SMC Final Monitoring Workplan and Quality Assurance Project Plan developed during spring 2009.

Toxicity Identification Evaluation Testing

Toxicity Identification Evaluations (TIEs) will be used to determine the causative agent of toxicity based on the Triad Approach to determining follow up actions. Currently, data do not support conducting TIEs in the southern sites with the exception of Tijuana River and Chollas Creek. These two sites have had TIEs conducted previously and the causative agents of toxicity have been identified. The Copermittees have budgeted for three full phase I TIEs in the event significant toxicity is observed at a new TWAS during more than one event for the same species.

The following is a summary of the TIE studies performed during the previous permit cycle.

1. Chollas Creek – Insufficient toxicity to *H. azteca* was detected in 2002-03 season to conduct TIEs. During 2004-05 a TIE was initiated, but the results were inconclusive. Initial toxicity could not be duplicated during the TIE. During 2005-06 TIEs were conducted and found to be related to the synthetic pyrethroid class of pesticide compounds. Three TIEs were conducted and found to be conclusive in identifying these compounds. Confirmatory TIEs performed during the 2006-07 monitoring season also confirmed synthetic pyrethroids as the causative agent of toxicity. Due to the presence of synthetic pyrethroids in storm water samples during 2007-2008, TIEs were not conducted at Chollas Creek.
3. Sweetwater River - Toxicity to *Selenastrum capricornutum* has been previously observed but has not been determined to exceed the threshold for persistency (>50% toxicity). One storm event was evaluated for a TIE in 2002-03 and results indicated toxicity due to non-polar organics. Persistent toxicity was not observed during 2003-04.

During 2005-06 only one event resulted in toxicity to *S. capricornutum*. TIEs performed during the first monitoring event identified dissolved solids as the likely cause of toxicity. Toxicity was not observed during the remaining two storm events. Based on the historical data set, persistent toxicity is not evident.

4. Tijuana River - TIEs indicated toxicity to *C. dubia* due to three compounds, (Diazinon, methyl dihydrojasmonate, quinoline/products). TIEs have not been performed at the Tijuana River MLS samples over the past two monitoring seasons due to consistently similar water quality issues. The Tijuana River was not included during the 2007-2008 monitoring rotation as indicated in Table 1 of the Order.

Ambient Bay, Lagoon, and Coastal Receiving Water Monitoring

The ambient bay, lagoon, and coastal receiving waters monitoring program (ABLM) completed three years of monitoring in 2005 and was assessed for program effectiveness. The assessment was reported to the Regional Water Quality Control Board in the 2005-06 Annual Monitoring Report. The Copermittees received comments from the RWQCB on May 3, 2007 indicating the requirements for conducting a revised ABLM Program. Further clarification from the RWQCB indicated the ABLM program would not be required during the summer of 2007. In lieu of conducting a revised ABLM program, the Copermittees contributed a significant amount of effort towards the Bight 08 monitoring program during the summer of 2008. The San Diego Copermittees, in collaboration with the Southern California Coastal Water Research Project (SCCWRP) and the RWQCB staff, developed a longitudinal transect study design to characterize eight San Diego lagoons in order to provide more spatial data in relation to major tributary inputs while simultaneously providing the needed information for the Bight 08 random study design. The RWQCB again indicated that the funds for the ABLM program for the 2007-2008 and 2008-2009 programs would be applicable to Bight 08 in light of the proposed study design (July 12, 2008 Letter from John Robertus to Jo Ann Weber, WPS: Place Number 710562: lbuse).

- Following the findings of the Bight 08 studies it determined that a more refined ABLM program was needed in order to fill data gaps.
- The Copermittees developed a revised ABLM Work plan through Copermittees' collaboration during spring and summer 2009.

The ABLM Program activities to be conducted during the 2009-2010 monitoring season are provided below (and details provided in Appendix D):

Samples will be collected from 12 sediment stations and 4 water quality stations in Agua Hedionda Lagoon in accordance with the 2010-2012 Ambient Bay and Lagoon Monitoring Workplan. Samples will be collected from 12 sediment locations and analyzed for sediment chemistry, sediment toxicity, and benthos for the purpose of assessing the data with respect to the recently developed Sediment Quality Objective Guidelines for Enclosed Bays and Estuaries. Water quality samples will be collected from four stations and analyzed for chemistry and physical parameters.

The sampling design was developed to answer two specific questions as follows:

1. To determine the stressors (both natural and anthropogenic) that influences the distribution of benthic organisms.

- To determine the stressors (both natural and anthropogenic) that contributes to amphipod toxicity.

The station locations were selected based on results from the Bight 08 study from the previous year, where one out of five locations was identified as being possibly impacted based on the SQO guidelines. The site result was driven primarily by a high impact for the benthic score while the chemistry and toxicity scores indicated a low impact. This is a common finding in other lagoons and suggests a need for study focus on the benthic community. The other four stations sampled under Bight 08 were identified as likely unimpacted or unimpacted. Therefore, the focus of the ABLM special study is directed toward assessing the impact to the benthic community.

The specific analyses and method detection limits (MDLs) for sediment samples are specified in Table 4.

Physical Analysis

Physical analyses of sediment will include grain size and percent solids. Grain size is analyzed to determine the general size classes that make up the sediment (e.g., gravel, sand, silt, and clay). The frequency distribution of the size ranges (reported in mm) of the sediment will be reported in the final data report. Grain size will be conducted using the gravimetric procedure described in Plumb (1981). Percent solids will also be measured to convert concentrations of the chemical parameters from a wet-weight to a dry-weight basis according to USEPA 160.3.

Chemical Analysis

Chemical analyses of sediment will include ammonia, dissolved and total sulfides, TOC, total nitrogen, total phosphorus, metals, synthetic pyrethroids, chlorinated pesticides, PCBs, and PAHs.

Table 4. Chemical and Physical Parameters for Sediment Samples

Parameter	Method	Procedure	Method Detection Limit (dry weight)	Reporting Limit (dry weight)
Physical / Conventional Tests				
Ammonia	SM 4500-NH3F	ICP/MS	0.03 mg/wet kg	0.03 mg/wet kg
Dissolved Sulfides	Plumb (1981)	Titrametric	0.2 mg/kg	0.4 mg/kg
Grain Size	Plumb (1981)	Sieve/Pipette	1.0%	1.0%
Percent Solids	USEPA 160.3	Gravimetric	0.1%	0.1%
Total Organic Carbon	USEPA 9060A	Combustion IR	0.01%	0.02%
Total Nitrogen	SM 4500-N	Colorimetric	2 mg/kg	4 mg/kg
Total Phosphorus	SM 4500-P E	Colorimetric	0.016 mg/kg	0.05 mg/kg
Total Sulfides	Plumb (1981)	Titrametric	0.2 mg/kg	0.4 mg/kg
Metals				
Aluminum (Al)	USEPA 6020m	ICP/MS	1 µg/g	5 µg/g
Antimony (Sb)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Arsenic (As)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Barium (Ba)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Beryllium (Be)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Cadmium (Cd)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Chromium (Cr)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Copper (Cu)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g

Parameter	Method	Procedure	Method Detection Limit (dry weight)	Reporting Limit (dry weight)
Iron (Fe)	USEPA 6020m	ICP/MS	1 µg/g	5 µg/g
Lead (Pb)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Mercury (Hg)	USEPA 245.7m	CVAFS	0.01 µg/g	0.02 µg/g
Nickel (Ni)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Selenium	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Silver	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Zinc (Zn)	USEPA 6020m	ICP/MS	0.025 µg/g	0.05 µg/g
Synthetic Pyrethroids				
Allethrin	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
Bifenthrin	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
Cyfluthrin	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
Cypermethrin	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
Danitol (Fenpropathrin)	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
Deltamethrin	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
Esfenvalerate	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
Fenvalerate	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
L-Cyhalothrin	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
Permethrin	USEPA 8270CmNCI	GC/MS-NCI	5 ng/g	25 ng/g
Prallethrin	USEPA 8270CmNCI	GC/MS-NCI	0.5 ng/g	2 ng/g
Organochlorine Pesticides				
2,4'-DDD	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
2,4'-DDE	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
2,4'-DDT	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
4,4'-DDD	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
4,4'-DDE	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
4,4'-DDT	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Aldrin	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
BHC-alpha	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
BHC-beta	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
BHC-delta	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
BHC-gamma	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Chlordane-alpha	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Chlordane-gamma	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
cis-Nonachlor	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
DCPA (Dacthal)	USEPA 8270Cm	GC/MS SIM	5 ng/g	10 ng/g
Dicofol	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Dieldrin	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Endosulfan I	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Endosulfan II	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Endosulfan Sulfate	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Endrin	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Endrin Aldehyde	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Endrin Ketone	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g

Parameter	Method	Procedure	Method Detection Limit (dry weight)	Reporting Limit (dry weight)
Heptachlor	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Heptachlor Epoxide	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Methoxychlor	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Mirex	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Oxychlorthane	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Perthane	USEPA 8270Cm	GC/MS SIM	5 ng/g	10 ng/g
Toxaphene	USEPA 8270Cm	GC/MS SIM	10 ng/g	50 ng/g
trans-Nonachlor	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
PCBs				
PCB Congeners	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
PAHs				
1-Methylnaphthalene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
1-Methylphenanthrene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
1,6,7-Trimethylnaphthalene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
2,6-Dimethylnaphthalene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
2-Methylnaphthalene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Acenaphthene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Acenaphthylene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Anthracene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Benzo(a)anthracene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Benzo(a)pyrene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Benzo(b)fluoranthene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Benzo(e)pyrene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Benzo(g,h,i)perylene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Benzo(k)fluoranthene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Biphenyl	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Chrysene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Dibenzo(a,h)anthracene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Fluoranthene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Fluorene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Indeno(1,2,3-cd)pyrene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Naphthalene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Perylene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Phenanthrene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g
Pyrene	USEPA 8270Cm	GC/MS SIM	1 ng/g	5 ng/g

Water Samples

The specific analyses of water samples are specified in Table 5. Water quality measurements will be taken in the field using YSI 6600 data sondes.

Table 5. Chemical and Physical Parameters for Water Samples

Parameter	Method/Instrument	Units	Reporting Limit
Field Measurements			
Dissolved oxygen	YSI 6600	mg/L	0.2
pH	YSI 6600	pH units	1-14
Salinity	YSI 6600	ppt	1-75
Temperature	YSI 6600	°C	0-100

Parameter	Method/Instrument	Units	Reporting Limit
Physical / Conventional Laboratory Tests			
Chlorophyll-a	SM 10200 H	mg/m ³	2
Dissolved Organic Carbon	SM 5310 B	mg/L	0.2
Total Nitrogen	SM 4500-N	mg/L	4
Total Phosphorus	SM 4500-P E	mg/L	0.05
Total Suspended Solids	SM 2540 D	mg/L	5

Coastal Storm Drain Monitoring

The Coastal Copermittees will conduct the CSDM Program in accordance with the Coastal Storm Drain Monitoring Plan.

Synthetic Pyrethroid Monitoring and Assessment

In addition to water quality monitoring for synthetic pyrethroids conducted at the MLS and TWAS as mentioned previously, one time sediment sampling will occur at each MLS/TWAS following the first storm event of the season. Monitoring and assessment will be conducted in accordance with the Monitoring Workplan for the Assessment of Synthetic Pyrethroids in San Diego County included in the County of San Diego Copermittees Scope of Work for the Regional Monitoring Program for 2007-2008. Monitoring will be conducted following the first flush rainfall event of the season. Five samples from 3 monitoring reaches at each site will be collected and composited into one sample (total of 14 samples in the southern watersheds). These samples will be submitted to a California state certified analytical laboratory to be analyzed for Synthetic Pyrethroids by GC/MS-NCI, total organic carbon, and grain size distribution. One duplicate and one equipment rinse blank will be collected during the monitoring event.

URBAN RUNOFF MONITORING

MS4 Outfall Monitoring

MS4 outfall monitoring will be conducted in accordance with the Municipal Separate Storm Sewer System (MS4) Outfalls Monitoring Program in San Diego County Watershed Management Areas Workplan. A revised plan that includes updates and corrections is attached in Appendix E.

The monitoring design is based on a combination of random and targeted sampling of discharges from MS4 outfalls that drain into receiving waters (Table 6). Both types of monitoring will be applied to dry weather and wet weather periods during the 2009-2010 permit year.

Table 6. Summary of the Proposed MS4 Outfall Monitoring Design

Season	Design Type	Outfall Diameter	Number of Samples
Dry	Random	≥36 inches	54 per year
	Targeted	Any	200 per year
Wet	Random	≥36 inches	54 per year
	Targeted	Any	9 per Permit cycle

Random Sampling

This approach is based on a stratified random study design to characterize the discharges of six MS4 outfalls discharging to receiving waters during dry and wet weather periods in each of the nine WMAs. In this design the region is divided into nine strata that are each defined by a WMA. The six samples are selected randomly within each strata or WMA.

Six random sample locations will be collected annually during the dry weather season from each of the nine (9) WMAs. Each site will be sampled during an index period beginning 4 weeks following the last significant rainfall (0.2 inches or greater), but after April 30, and ending August 1. In addition, no sampling shall occur within 72 hours of any measurable (greater than 0.1 inch) rainfall.

Six random sample locations will be collected annually during the wet weather season (October 1st through April 30th) from each of the nine (9) WMAs. Random wet weather samples will be collected during any part of a storm with at least 0.1 inch of predicted total rainfall. To the extent practical, the first storm events of the wet season will be equally sampled with subsequent storms during the later part of the wet weather season. The purpose will be to collect a distribution of grab samples from the MS4 outfalls in storms that are representative of the entire wet weather season.

Random samples of the discharges from the MS4 outfalls will be analyzed for the following analytes:

- Total Suspended Solids
- Total Phosphorus

- Total Nitrogen
- Total Coliforms
- Fecal Coliform, and
- Enterococcus.

Targeted Sampling

The targeted sampling approach focuses monitoring efforts on those MS4 outfalls that are most likely to contribute to receiving water problems (e.g., largest potential constituent loading). The Regional Monitoring Copermittees will collect up to 200 dry weather discharge samples from targeted MS4 outfalls in the region during the 2009-2010 monitoring year. The number of sites varies proportionally by watershed and jurisdiction. Sample analyses are based on the watershed water quality priorities, and where applicable, the 303(d) listed impairments within the watershed. Each site will be sampled during an index period beginning 4 weeks following the last significant rainfall (0.2 inches or greater), but after April 30, 2010, and ending August 1, 2010.

The wet weather targeted sampling approach is designed to quantify the relative loading of pollutants from MS4 outfalls that impact receiving waters. This approach focuses monitoring efforts on those MS4 outfalls that are most likely to contribute to receiving water problems (e.g., largest potential pollutant loading). Only outfalls that discharge directly (or the nearest safely accessible upstream location) to a river, stream, bay, estuary, or the Pacific Ocean will be targeted for sampling. Wet weather sampling will be conducted once in each WMA over the 5 year Permit period. Details of this program, which will be implemented for the first time this year are attached in Appendix F.

Wet weather targeted sampling is planned for three separate watershed stations during one wet weather event during the 2009-2010 wet weather season. The three watershed management areas tentatively selected for monitoring include Santa Margarita River, San Luis Rey River, and Carlsbad.

The Copermittees will collect pollutograph samples for high priority constituents in the watersheds being sampled. During the monitoring event, up to three individual flow weighted pollutograph samples will be collected to characterize constituent concentrations over the course of a flow event. The individual results will also be used to calculate an event mean concentration (EMC) based on the flow proportioned samples. This sampling will follow similar methods recommended by the Southern California Coastal Water Research Project (SCCWRP, Ackerman and Stein, 2009). Up to three samples will be collected for bacteriological analyses (total coliform, fecal coliform, and enterococci). From the three samples, a composite sample will be collected by subsampling each of the three bacteriological samples and analyzed for bacteroides (presence/absence test for recent human fecal contamination).

Source Identification Monitoring

Source Identification monitoring will be conducted in accordance with the Urban Runoff Source Identification Program In San Diego County Watersheds Workplan.

The goal of the Source Identification Monitoring program is to identify and assess the sources of discharges of constituents related to urban runoff causing high priority water quality problems in

the receiving water(s) within each watershed management area (WMA). Because residential land use are the most predominant land use category in terms of percentage of urban areas, the Copermittees will focus on assessing residential land use runoff.

During the 2009-2010 monitoring season, the Copermittees will conduct a wet weather residential source investigation study (details provided in Appendix G). The focus of the 2009-2010 Source Identification Study is to assess the condition of wet weather runoff from single family residential land uses. This data will be useful for providing land use specific information for future TMDL development and assessment. The study will also build on the information collected from the dry weather residential source identification study conducted during the 2008-2009 monitoring season. Samples will be collected from a residential only catchment and analyzed for chemical, physical, and microbiology parameters specified in Table 7. During the monitoring event, up to three individual flow weighted pollutograph samples will be collected to characterize constituent concentrations over the course of a flow event. The individual results will also be used to calculate and event mean concentration (EMC) based on the flow proportioned samples. This sampling will follow similar methods recommended by the Southern California Coastal Water Research Project (SCCWRP, Ackerman and Stein, 2009). A storm event predicted at 0.2 inches of rainfall will be used for the storm criteria for monitoring and will not be the first flush storm of the season since the data will be used for comparison throughout the region and may be used for modeling purposes.

Table 7. List of Analytes, Methods, and Detection Limits

Analyte	Method	Units	Method Detection Limit	Reporting Limit
Total Coliform	SM 9221B, E	MPN/100mL	2	20
Fecal Coliform	SM 9221B, E	MPN/100mL	2	20
Enterococcus	SM 9230	MPN/100mL	2	20
<i>E. coli</i>	IDEXX	MPN/100mL	1	10
Cadmium (dissolved)	EPA 200.8	µg/L	0.2	0.4
Copper (dissolved)	EPA 200.8	µg/L	0.4	0.8
Lead (dissolved)	EPA 200.8	µg/L	0.05	0.1
Zinc (dissolved)	EPA 200.8	µg/L	0.1	0.5
Hardness	SM 2340 B	mg/L	1	5
Organophosphate Pesticides	EPA 625 (m)	ng/l	Varies by analyte	
Synthetic Pyrethroid Pesticides	NCI-GCMS	ng/l	Varies by analyte	
Nitrate as N	EPA 300.0	mg/L	0.01	0.05
Nitrite as N	EPA 300.0	mg/L	0.01	0.05
Total Kjeldahl Nitrogen	SM 4500 N Org B	mg/L	0.455	0.5
Total Nitrogen (sum of TKN+nitrite+nitrate)	Calculation	mg/L	0.455	0.5
Total Phosphorus	SM 4500 P E	mg/L	0.016	0.05
Orthophosphate	EPA 300.0	mg/L	0.0075	0.01
Total Organic Carbon	SM 5310 B	mg/L	0.1	0.2
Dissolved Organic Carbon	SM 5310 B	mg/L	0.1	0.2
Bromide	EPA 300.0	mg/L	0.001	0.005

Chloride	EPA 300.0	mg/L	0.01	0.05
Total Dissolved Solids	SM 2540 C	mg/L	0.1	5
Total Suspended Solids	SM 2540 D	mg/L	0.5	5
Turbidity	EPA 180.1	NTU	1	2
pH	Meter	Units	0.5	0.5
Conductivity	Meter	ms/cm	0.1	0.1
Temperature	Meter	Deg. C	0.1	0.1

Annual Watershed Monitoring Reporting

The results of the monitoring activities conducted during the 2009-2010 monitoring year will be provided in an annual monitoring report and cover the following:

- MLS/TWAS wet and dry weather monitoring
- Rapid Stream Bioassessment and SMC Regional Monitoring Surveys
- Toxicity Identification Evaluations
- Ambient Bay and Lagoon Monitoring
- Bight 08 Microbiology Regrowth Study in San Diego County
- Dry Weather Field Screening and Analytical Monitoring Program
- Coastal Storm Drain Monitoring
- Pyrethroid Monitoring
- MS4 Outfall Monitoring
- Source Identification Monitoring
- Available Third Party Data from the 2009-2010 monitoring year

This report will include data and results summaries, explanations and discussions of data. Data comparisons, recommendations for future monitoring (based on the Watershed Data Assessment Framework being developed collaboratively with the Copermittees during the 2009-2010 Monitoring Year); comparison of current storm water monitoring results to previous years monitoring results, watershed management area assessments, and identification of trends will be included in the report. This report will build upon the database developed during the previous seasons for long-term trend analysis and provide:

1. Watershed-based analysis of findings for each monitoring program component including:
 - Identification and prioritization of water quality problems
 - Watershed water quality characterization and potential source analysis
 - Load/Concentration Analyses at MLS
 - Statistical evaluation of loads/concentrations at MLS to land use, population, and sources
 - Source activity linkage to water quality impacts
 - Identification of recommended future monitoring to identify and address sources of water quality problems
 - Results and discussion of TIEs, along with actions to reduce pollutant discharge and abate sources causing toxicity. Identification of areas that may require TIEs based on analysis of chemical and toxicity data at the MLS as required in Order No. 2007-0001 (Section II.A.4)
2. Detailed description of all monitoring conducted under Investigation Order No. R9-2004-0277 for Chollas Creek, as well as information required by Investigation Order No. R9-2004-0277.
3. Discussion for each watershed and how the monitoring answers each of the management questions listed in section I.B of the Order.

4. Identification of how the goals listed in section I.A of the Order are addressed by monitoring, including:
 - Compliance with the Order No. R9-2007-0001.
 - Measure and improve effectiveness of monitoring programs.
 - Assess chemical, physical, and biological impacts based on a “weight of evidence approach” in evaluating storm water effects. This includes creek health as measured by biological community diversity (bioassessment monitoring), as well as storm water quality measured at the mass loading station for chemical, physical and bacteriological contaminant levels (chemistry and microbiology tests) and toxic effects to organisms (toxicity testing).
 - Characterize urban runoff discharges by calculating wet and dry weather pollutant loading estimates based on almost year round flow data.
 - Identify sources of specific pollutants using the Source Identification monitoring program results.
 - Prioritize drainage and sub-drainage areas that need management actions by identification of potential areas of concern based upon exceedances of water quality objectives, toxic effects, or community degradation in hydrologic units.
 - Detect and eliminate illicit discharges and illicit connections to the MS4 through use of information collected in the Dry Weather Field Screening and Analytical Monitoring program.
 - Assess the overall health of receiving waters using information from all components of the receiving water monitoring program, including MLS, Bight 08 Monitoring Data, and Bioassessment monitoring data from participation in the Storm Water Monitoring Coalition Spring 2009 survey.
 - Use of third party data to assist in the assessment of watersheds as applicable and available.
 - Incorporation of the Long Term Effectiveness Assessment (BLTEA) rating tables presented in the 2005-06 Annual Report. This will be limited to reporting the assessment tables based on the previous five year data set.
5. Identification and analysis of long-term trends in storm water or receiving water quality using appropriate non-parametric methods.
6. Calculation of annual pollutant loads (wet and dry weather) due to urban runoff, in watersheds identified in Table 4 of Order No. R9-2007-0001.
7. Include an assessment for all monitoring program components listed above (both receiving water and urban runoff) for compliance with relevant water quality objectives or action levels as applicable.
8. Describe monitoring station locations by latitude, and longitude, frequency of sampling, quality assurance/quality control procedures, and sampling analysis and protocols.
9. A standard format will be used that includes a standalone comprehensive executive summary addressing all section of the monitoring report; comprehensive interpretations and conclusions; and recommendations for future actions.

Following the development and review of a draft Annual Monitoring Report, all comments received from the Copermittees will be addressed, summarized, and responses will be provided.

Copermittees will collaborate to resolve comments, and the response to comments letter will be incorporated as an appendix to the document. All necessary revisions will be made and a final report will be provided to meet the RWQCB January 31, 2011 deadline.

Referenced Workplans (previously submitted to SDRWQCB)

Monitoring Workplan for the assessment of Trash in San Diego County.

Monitoring Workplan for the Assessment of Synthetic Pyrethroids in San Diego County Watersheds

Regional Monitoring of Southern California's Coastal Watersheds, Stormwater Monitoring Coalition, Bioassessment Working Group, Final Draft

Coastal Storm Drain Monitoring Program

Municipal Separate Storm Sewer System (MS4) Outfalls Monitoring Program in San Diego County Watershed Management Areas

Urban Runoff Source Identification Monitoring Program in San Diego County Watersheds

Appendices Provided as Separate Files

Appendix A – Microbiology Regrowth Study Workplan

Appendix B – Revised Trash Assessment Field Form

Appendix C – SMC Regional Monitoring Workplan

Appendix D – 2010-2012 Ambient Bay and Lagoon Monitoring Workplan

Appendix E – Municipal Separate Storm Sewer System (MS4) Outfalls Monitoring Program in San Diego County Watershed Management Areas – Revision 1.

Appendix F –MS4 Outfall Wet Weather Targeted Monitoring Workplan

Appendix G –2009-2010 Source Identification Monitoring Program Workplan