MONITORING PROGRAM OBJECTIVES

The major objectives of the Monitoring Program outlined in the Municipal Storm Water Permit are to:

- Assess compliance with the Los Angeles County Municipal Storm Water Permit No. CAS004001;
- Measure and improve the effectiveness of the Stormwater Quality Management Plans (SQMPs);
- Assess the chemical, physical, and biological impacts of receiving waters resulting from urban runoff;
- Characterize storm water discharges;
- Identify sources of pollutants; and
- Assess the overall health and evaluate long-term trends in receiving water quality.

The Monitoring Program was designed to address these objectives through the implementation of its several elements: core monitoring, which includes mass emission monitoring, water column toxicity monitoring, tributary monitoring, shoreline monitoring, and trash monitoring; regional monitoring, which includes estuary sampling and bioassessment; and three special studies, which include the new development impacts study in the Santa Clara watershed, the peak discharge impact study, and the Best Management Practice (BMP) effectiveness study.

SUMMARY OF MONITORING RESULTS

CORE MONITORING

Mass Emission Monitoring

The purpose of mass emission monitoring is to estimate the mass emissions from the Municipal Separate Storm Sewer System (MS4), assess trends in the mass emissions over time, and determine if the MS4 is contributing to exceedances of water quality standards by comparing results to applicable standards in the Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan), the California Ocean Plan (Ocean Plan), or the California Toxics Rule (CTR), and with emissions from other discharges.

Flows were measured and water quality samples were taken at the following seven mass emission monitoring sites: Ballona Creek, Malibu Creek, Los Angeles River, Coyote Creek, San Gabriel River, Dominguez Channel, and Santa Clara River. All mass emission sites, except the Santa Clara River site, are equipped with automated samplers with integral flow meters for collecting flow-composite samples. A minimum of three storm events, including the first storm, and two dry weather events were sampled at each mass emission site. Total Suspended Solids (TSS) were collected from four storm events at the Santa Clara River mass emission site; eight storm events at the Ballona Creek, Malibu Creek, and Los Angeles River mass emission sites; and seven storm events at Coyote Creek, Dominguez Channel, and San Gabriel River mass emission sites.

Based on results of the mass emission monitoring, three different water quality analyses, i.e., a comparison to appropriate water quality standards, an analysis of pollutant loadings and trends, and an evaluation of the correlation between metals/polycyclic aromatic hydrocarbons (PAHs) and total suspended solids (TSSs), were conducted.

Summaries of the analyses are as follows:

Comparison Study

A comparison of the monitoring results to the applicable water quality standards in the Basin Plan, the Ocean Plan, or the CTR was conducted. The most conservative standard of the three documents was used for the comparison study. The California Department of Fish and Game provided fresh water final acute criteria water quality standards for Chlorpyrifos and Diazinon. The Basin Plan is designed to enhance water quality and protect the beneficial uses of all regional waters. The Ocean Plan is applicable to point source discharges to the ocean. The CTR promulgates criteria for priority toxic pollutants in the State of California for inland surface waters and enclosed bays and estuaries.

The following conclusions were drawn from the mass emission comparison study:

Wet Weather

Results of concern were chosen to be those in which at least 75% of samples exceeded applicable water quality standards. This is similar to the pollutant investigation threshold of 3 exceedances of 4 sampling events in the Tributary Monitoring Program.

- Enterococcus, Fecal Coliform, and Total Coliform exceedances surpassed the above mentioned threshold at all mass emission monitoring sites.
- Total Copper exceedances were a concern in all watersheds, except for San Gabriel River and Santa Clara River.
- Dissolved Copper exceedances were a concern in Los Angeles River and Dominguez Channel.
- Total Zinc exceedances were a concern in Los Angeles River, Dominguez Channel, and Ballona Creek.
- Total Aluminum exceedances surpassed the 75% threshold at Ballona Creek and Santa Clara River.
- Total Lead was a concern in Ballona Creek.
- Sulfate exceedances were a concern at Malibu Creek. Sulfate was not identified as a Constituent of Concern in the 1994-2005 Integrated Receiving Water Impacts Report, but exceedances for Sulfate were found in all samples taken at Malibu Creek.
- Notable differences between this year's results and the 1994-2005 list of Constituents of Concern are that no dissolved metals exceedances were found in any of the watersheds during this monitoring season. Dissolved metals are a Constituent of Concern in Coyote Creek, Los Angeles, River, Dominguez Channel, and Ballona Creek.

- There were no exceedances of the standard for Cyanide, whereas it is a Constituent of Concern across all watersheds.
- Diazinon is a Constituent of Concern in Dominguez Channel and Santa Clara River, but no exceedances were found in any watersheds during this monitoring year.

Dry Weather

Since the Municipal Storm Water Permit requires only two dry weather samples at each mass emission monitoring station, at least 75% exceedance of events indicates that both samples exceeded the water quality standard.

- Total Coliform and Enterococcus exceedances were a concern in all watersheds, except for Malibu Creek.
- Fecal Coliform exceedances surpassed the above mentioned threshold at Coyote Creek, Los Angeles River, Dominguez Channel, and Ballona Creek.
- Cyanide exceedances were a concern at Los Angeles River and Coyote Creek.
- Malibu Creek had no exceedances of the water quality standards for Enterococcus and Fecal Coliform during dry weather during this season.
- These results were in general agreement with those on the list of Constituents of Concern identified in the 1994-2005 Integrated Receiving Water Impacts Report. The strongest exceptions were that no dissolved metals or Diazinon exceedances were found.
- Total metals exceedances did not surpass the 75% exceedances threshold mentioned above.
- Cyanide exceedances crossed the 75% exceedances parameter only at the Coyote Creek and Los Angeles River, although it is a listed Constituent of Concern across all watersheds

Loading and Trend Analysis

An estimation of the total pollutant loads due to storm water and urban runoff for each mass emission station is shown on Table 4-9. As required by the Municipal Storm Water Permit, samples were collected and analyzed for TSS at all mass emission stations equipped with automated samplers for all storm events that resulted in at least 0.25 inches of rainfall. The concentrations for TSS for each storm is shown on Table 4-7 and the total pollutant loading for TSS for each mass emission station is shown on Table 4-8. By analyzing the pollutant loading at each mass emission station, it is possible to see if there is any correlation between storm events and the amount of pollutant loading. An analysis of trends in storm water or receiving water quality is represented in Figure 4-4. Although it is difficult to see any sustained trends at this time, they will become more apparent in years to come as sampling continues.

The following conclusions were deduced from the loading analysis:

- The total runoff volume and pollutant loading at the Los Angeles River monitoring station was usually higher than at the other monitoring stations. Los Angeles River has approximately two to twenty five times the surface area of the other watersheds. This creates more potential for surface runoff pollution and likely explains, in part, the

increased loading of constituents at the Los Angeles River monitoring station when compared to the other monitoring stations. However, it should be noted that differences in loading at different monitoring stations are not directly correlated with watershed surface area. For example, Total Aluminum loadings at Dominguez Channel for the 10/17/05 storm were approximately seven times less than at the Los Angeles River, while the Los Angeles River watershed is twenty five times larger than that of Dominguez Channel.

- The storm on February 27, 2006 produced the single largest TSS load of the season at the Los Angeles River with a load 17,750 tons. This storm was very similar in total precipitation to the December 31, but had approximately 3.5 times the runoff volume and 10 times the TSS load. Loading rates are highly variable even within the same watershed. The next highest TSS loads from a monitored storm occurred on October 17,2005, perhaps indicating a first flush phenomena. The Los Angeles River is the largest contributor of TSS out of the seven mass emission stations monitored.
- Four of the seven mass emissions stations exhibited first flush phenomena for TSS during the October 17, 2005 storm. The Los Angeles River would also have a first flush phenoma if the single loading event of February 27, 2006 is ignored. However, the last monitored event at the Los Angeles River on March 28, 2006 had almost the same TSS load as the first event, suggesting that TSS evolution or deposition is a continuous process or that discreet sources of TSS, such as exposed soil at construction sites, became available during the storm season.
- TSS concentrations were usually much higher during wet weather than during dry sampling events. However, the April 25, 2006 sampling event at Ballona Creek revealed a TSS concentration that was 1 to 2 orders of magnitude greater than any of the other TSS concentrations analyzed during the same event. This Ballona Creek TSS concentration was the third highest at that station during the storm season, less than only the presumed first flush of October 17, 2005 and the large storm on December 31, 2005. It is likely that this drastic increase in TSS concentration was due to a point source.
- High levels of aluminum, bacteria, copper, lead, nickel and zinc were observed at most mass emission stations during most events, and the metal s tended to decline through the storm season.
- MBAS loading, which indicates the presence of surfactants, was generally higher in the more urbanized watersheds. MBASs tended to exhibit first flush phenomena in more rural watersheds, but tended to be present at fairly constant levels in the more urbanized watersheds. This suggests a continuous source (perhaps industrial) in the urbanized areas, while the more rural watersheds may have periodic or seasonal sources.
- COD loads exceeded Dissolved Oxygen (DO) loads at all stations during all storms. BOD exceed DO at most locations during most storms. However, BOD was less than the DO load at Malibu Creek for 3 storms, at San Gabriel River for 2 storms and for 1 storm at both Coyote Creek and the Santa Clara River. This is most likely due to a combination of flow characteristics and watershed urbanization. It is not unusual for COD and BOD to

exceed DO, and moving bodies of water rely upon gas exchange with the atmosphere to prevent anaerobic conditions from developing. Water from the MS4 system can be expected to become anaerobic if it is introduced to an environment where sufficient mixing does not occur, and therefore may not be suitable for impoundment or introduction into enclosed basins such as Oxford Basin.

- The highest Total Dissolved Solids (TDS) loadings occur at San Gabriel River during the October 17, 2005 storm and at Malibu Creek during the December 31, 2005 storm. In general, TDS loads increased during the storm season, most likely due to the presence of water in the watersheds after the first storm. This water collected dissolved materials and was then flushed into the MS4 system by additional rainfall. Malibu Creek has a lot of exposed geologic formations which may contribute to TDS loading, and the San Gabriel River receives imported waters which may contain elevated TDS levels.

Correlation Study

An analysis of the correlation between metals/PAHs and TSS levels was performed. The study focused on metals because the PAH samples at all of the mass emission monitoring stations were non-detects.

A trend line was projected on each of the metals-versus-TSS plots and the coefficient of determination (R^2) was calculated to see if there was any correlation between the concentrations for each metal and TSSs. The closer the value of R^2 is to the number one, the stronger the correlation of the two variables.

The following conclusions were deduced from the correlation study analysis:

- Few very strong correlations between TSS and metals concentrations were found. The highest R^2 value was for Dissolved Antimony (0.95) in the Adams Drain Watershed.
- 5 correlations with a R^2 value greater than 0.5 were found in the Santa Clara Watershed (Dissolved Aluminum, 0.80; Dissolved Barium, 0.64; Dissolved Iron, 0.68; Dissolved Nickel, 0.59; and Total Nickel, 0.59).
- No correlations with a R^2 value greater than 0.5 were found when examining the entire Ballona Creek Watershed. The highest R^2 value was 0.44 for Dissolved Barium.
- Adams Drain Watershed had 13 correlations with a R^2 value greater than 0.5 (Total Aluminum, 0.64; Dissolved Antimony, 0.95; Total Antimony, 0.74; Dissolved Arsenic, 0.60; Total Barium, 0.55; Total Chromium, 0.61; Total Copper, 0.53; Dissolved Iron, 0.51; Total Iron, 0.67; Dissolved Lead, 0.53; Total Lead, 0.65; Dissolved Nickel, 0.56; Total Zinc, 0.65).
- Correlation of TSS and metal concentrations is poor in large watersheds with multiple sources of metals. Correlations are better in smaller watersheds, most likely due to the relatively larger degree of homogeneity in metals sources. The Santa Clara Watershed exhibited more correlation between TSS and metals than the more urbanized Ballona Creek Watershed, but less than the much smaller Adams Drain Watershed. TSS correlation should be discontinued in the Mass Emissions Monitoring Program, but may prove to be a useful tool in the Tributary Monitoring Program.

Water Column Toxicity Monitoring

The purpose of water column toxicity monitoring is to evaluate the extent and causes of toxicity in receiving waters and to modify and utilize the SQMP to implement practices that eliminate or reduce sources of toxicity in storm water.

Samples were taken at all mass emission monitoring stations. In total, four samples were analyzed for toxicity at each site. Dry weather samples were collected on November 29, 2005 (at Ballona Creek and Santa Clara River mass emission sites), on January 24, 2006 (at Malibu Creek, Los Angeles River, Coyote Creek, San Gabriel River, and Dominguez Channel mass emission sites), and on April 25, 2006 (at all 7 mass emission sites). Wet weather samples were collected during the first rain event of the season on October 17, 2005 (at all 7 mass emission sites), on November 9, 2005 (at Ballona Creek and Malibu Creek mass emission sites), on December 31, 2005 (at Los Angeles River, Coyote Creek, San Gabriel River, and Santa Clara River mass emission sites), and also on January 3, 2006 (at the Dominguez Channel mass emission site).

A minimum of one freshwater and one marine species was used for toxicity testing, specifically Ceriodaphnia dubia (water flea) 7-day survival/reproduction and Strongylocentrotus purpuratus (sea urchin) fertilization .

A minimum of one freshwater and one marine species was used for toxicity testing, specifically Ceriodaphnia dubia (water flea) 7-day reproduction/survival and Strongylocentrotus purpuratus (sea urchin) fertilization. Results calculated from the Ceriodaphnia dubia and Strongylocentrotus purpuratus tests included the No Observed Effect Concentration (NOEC), 50% Effective Concentration (EC50), 50% Lethal Concentration (LC50), and toxicity unit (TU). NOEC is the highest concentration of toxicant that would cause no observable adverse effects on the test organisms, which means the values for the observed responses statistically are insignificantly different from the controls. EC50 is the toxicant concentration that would cause an observable adverse effect on a quantal response (such as death, fertilization, germination, or development) in 50% of the test population. A quantal response is an all-or-none response. For example, death is a quantal response because a test organism can only be either dead or alive after being exposed to the toxicant concentration in the test sample. When the observable effect is death or immobility, the term Lethal Concentration or LC is used in place of the term Effective Concentration or EC. Therefore, LC50 is the concentration that produces a 50% reduction in survival. TU is defined in the permit as 100/(LC50 or EC50). A TU value greater than or equal to 1.00 is considered substantially toxic and requires a toxicity identification evaluation (TIE).

The following conclusions were deduced from water column toxicity testing:

- Ceriodaphnia dubia survival and reproduction were only significantly affected by exposure to the wet weather sample collected from the Dominguez Channel mass emission station on October 17, 2005. This sample had a TU value of 1.23 for the survival test and that of 1.10 for the reproduction test. In accordance with the Permit, the “baseline” test was conducted and toxicity was not observed in this sample, indicating that further TIE manipulations were not necessary. The fact that a slight amount of toxicity was observed in

the initial chronic tests indicated that the toxicant was most likely associated with volatile compound(s). The compound(s) apparently dissipated to non-toxic levels between the time of the initial toxicity tests and initiation of the "baseline" toxicity testing.

- Sea urchin fertilization was significantly affected by exposure to the wet weather samples collected from the Ballona Creek, Los Angeles River, and Dominguez Channel mass emission stations on October 17, 2005. These samples had TU values equal to 1.31, 1.29, and 1.30, respectively. The wet weather sample collected from Ballona Creek on November 09, 2005 also had a TU value of 1.34 for the fertilization test. These TU values triggered a TIE study in accordance with the Permit. The "baseline" tests conducted on these samples did not detect any toxicity, indicating no purpose to continue with further TIE manipulations. The fact that a slight amount of toxicity was observed in the initial chronic tests indicated that the toxicant was most likely associated with volatile compound(s). The compound(s) apparently dissipated to non-toxic levels between the time of the initial toxicity tests and initiation of the "baseline" toxicity testing.

- Ceriodaphnia dubia survival and reproduction were only significantly affected by exposure to the dry weather sample collected from the Malibu Creek mass emission station on April 25, 2006. This sample had a TU value of 1.60 for the survival test and that of 2.01 for the reproduction test, which triggered a TIE study in accordance with the Permit. The initial component of the TIE study was to conduct a "baseline" test to determine the final TIE test dilutions. The "baseline" test was conducted and toxicity was not observed in this sample, indicating no purpose in continuing with the TIE analysis. The fact that a slight amount of toxicity was observed in the initial chronic tests indicated that the toxicant was most likely associated with volatile compound(s). The compound(s) apparently dissipated to non-toxic levels between the time of the initial toxicity tests and initiation of the "baseline" toxicity testing.

- Sea urchin fertilization was only significantly affected by exposure to the dry weather sample collected from the Los Angeles River mass emission station on January 24, 2006. This sample had a TU value equal to 1.42. In accordance with the Permit, a TIE was attempted on this sample and toxicity was not observed during the "baseline" toxicity testing, indicating no purpose for furtherance of the TIE analysis. The fact that a slight amount of toxicity was observed in the initial chronic tests indicated that the toxicant was most likely associated with volatile compound(s). The compound(s) apparently dissipated to non-toxic levels between the time of the initial toxicity tests and initiation of the "baseline" toxicity testing.

Tributary Monitoring

The purpose of tributary monitoring is to identify sub-watersheds where storm water discharges are causing or contributing to exceedances of water quality standards, and to prioritize drainage and sub-drainage areas that need management actions.

Sampling for the 2005-2006 season was conducted at six tributary monitoring stations in the Ballona Creek Watershed, same as for the 2004-2005 season. Exactly as during the 2004-2005 season, the tributaries monitored included Centinela Creek, Sepulveda Channel, Benedict Canyon, Adams Drain, Fairfax Drain, and Cochran. A minimum of four storm events and two dry events were sampled at each tributary monitoring site. Due to mechanical problems with the automated sampler at the Benedict Canyon site during the first storm of the season, October 17, 2005, no flow weighted composite samples were collected. Therefore, an additional storm was sampled, including both grab and flow weighted samples, on February 27, 2006.

In order to identify the sub-watersheds where storm water discharges are causing or contributing to exceedances of water quality standards, a comparison was made between tributary water quality results and the water quality objectives outlined in the Ocean Plan, the Basin Plan, and the CTR. The freshwater final acute criteria set by the California Department of Fish and Game was also used to provide water quality standards for Chlorpyrifos and Diazinon. Since the tributary monitoring stations collect samples from sub-watersheds within the Ballona Creek watershed, the results from the Ballona Creek Mass Emission station were also used in the analysis.

The following conclusions were drawn from the wet weather tributary comparison study:

- Enterococcus, Fecal Coliform, and Total Coliform were ubiquitous in all of the tributary watersheds, surpassing the above mentioned 75% exceedance threshold.
- Total Copper was a concern, as identified in the 1994-2005 Integrated Receiving Water Impacts Report, across all watersheds.
- Dissolved Copper exceedances were a concern at Adams Drain.
- Total Zinc surpassed the 75% threshold in all watersheds, except for Centinela Creek and Benedict Canyon.
- Dissolved Zinc exceedances were a concern at Adams Drain.
- Cyanide exceedances were a concern in Adams Drain and Cochran.
- Oil & Grease exceedances were a concern in Adams Drain.
- These results align with the Constituents of Concern for Ballona Creek, identified in the 1994-2005 Integrated Receiving Water Impacts Report. The exceptions are that no exceedances were found for Dissolved Lead, one of the Constituents of Concern.
- Total Zinc and Oil & Grease were not identified as Constituents of Concern for Ballona Creek.

The following conclusions were drawn from the dry weather tributary comparison study:

- Total Coliform and Enterococcus surpassed the 75% exceedance pollutant investigation threshold in all watersheds.
- Fecal Coliform exceeded the 75% threshold in all watersheds, except for Adams Drain.
- Total Copper was a concern in Adams Drain and Cochran.
- Total Zinc exceedances were a concern in Adams Drain.
- These results align with the Constituents of Concern for Ballona Creek mentioned above. The exceptions are that no exceedances were found for Dissolved Lead and Cyanide.
- Total Lead exceedances did not surpass the 75% threshold at any of the sites. Total Lead is a Constituent of Concern for Ballona Creek.
- Total Zinc is not on the list of Constituents of Concern for Ballona Creek, but a significant number of exceedances occurred at Adams Drain.

In order to help focus management actions in the Ballona Creek watershed, results from the last two years of monitoring were analyzed and a loading per area metric was used to prioritize pollutant reduction activities. To prudently plan for future activities, only the top three sites are recommended for management actions. The results indicated that it would benefit the Ballona Creek watershed to focus management actions upon Adams Drain, Cochran, and Fairfax Drain for all of the above Constituents of Concern for dry weather.

Trash Monitoring

The objectives of trash monitoring are to assess the quantities of trash in receiving waters after storm events and to identify areas impaired for trash. Visual observations of trash were made and a minimum of one photograph at each mass emission station was taken after four storm events including the first storm event.

At least 600 catch basin inserts and four Continuous Deflective System (CDS) units have been installed in various land uses, including commercial, high density single family residential, industrial, low density single family residential, and open space/parks, across the Los Angeles River and Ballona Creek watersheds for monitoring trash discharge rates. The trash collected from each device was separated into two categories: Anthropogenic and Sediment/Vegetation. After separating into these categories, the trash collected was then weighed and recorded. Five cleaning events were conducted at each watershed during this storm season.

The following conclusions were drawn from the trash monitoring results for anthropogenic trash in Los Angeles River and Ballona Creek watersheds:

Los Angeles River Watershed

- The rate of collected trash to tributary area in the Los Angeles River Watershed from five cleaning events for 2005-06 storm season was 3.3 lbs/acre. The largest amount of trash collected from a single event occurred after the third storm event.

- The Industrial land use was the largest trash contributor of the entire storm season with a rate of 8.5 lbs/acre. The second highest contributor was the Commercial land use with a rate of 5.3 lbs/acre. It was followed by the High Density Single Family Residential, the Open Space and then the Low Density Single Family Residential land uses with rates of 2.6 lbs/acre, 1.2 lbs/acre, and 0.1 lbs/acre, respectively.

Ballona Creek Watershed

- The rate of collected trash to tributary area in the Ballona Creek Watershed from five cleaning events for 2005-06 storm season was 5.3 lbs/acre. The largest amount of trash collected from a single event occurred after the first storm event.

- The Commercial land use was the largest contributor of the entire storm season with a rate of 21.5 lbs/acre. The second largest trash generated rate was from the Open Space/Park land use with 4.8 lbs/acre. It was followed by a tie between Industrial and Low Density Single Family Residential with 2.5 lbs/acre. Finally, the lowest contributor was the High Density Single Family Residential land use with 1.6 lbs/acre.

REGIONAL MONITORING

Estuary Sampling

In compliance with Section II.F of the storm water monitoring requirements, LACDPW is participating in the coastal ecology committee of the Bight 2003 project coordinated by the Southern California Coastal Waters Research Project (SCCWRP). The two primary objectives of Bight 2003 are to estimate the extent and magnitude of ecological change in the Southern California Bight (SCB) and to determine the mass balance of pollutants that currently reside within the SCB. Regional monitoring components include coastal ecology, shoreline microbiology, and water quality. This project has been conducted in collaboration with various organizations including regulators, wastewater and stormwater permittees, and citizen volunteers under the coordination of SCCWRP.

The goal of the Estuary Sampling program required under Section II.F is to supplement the regional monitoring of the SCB estuarine habitats by sampling estuaries for sediment chemistry, sediment toxicity, and benthic macroinvertebrate diversity to determine the spatial extent of sediment fate from storm water, and the magnitudes of its effects. In Los Angeles County, the estuaries being sampled are those of: Malibu Creek, Ballona Creek, Los Angeles River, San Gabriel River, and Dominguez Channel.

Following is an update on the status of the SCB Regional Monitoring and Estuary Monitoring during this reporting period:

All sampling and analyses for Estuary Monitoring were completed. The preliminary results were subsequently reported in the previous reporting period.

SCCWRP has issued the final Regional Monitoring reports for Sediment Toxicity and Sediment Chemistry. The remaining reports that will complete the Bight 2003 project are expected by December 2006.

The Sediment Toxicity report indicated that sediment toxicity was not wide spread in the SCB but was concentrated mostly in marinas and estuaries. In the Los Angeles Region, the majority of estuary sediment toxicity was observed in the Dominguez Channel and Ballona Creek and may have been the result of organic contaminants, possibly pesticides currently used in the watersheds.

The Sediment Chemistry report revealed that the majority of the SCB had some level of anthropogenic sediment constituents including metals and organic pollutants. However, only one percent of the SCB was at a moderate to high risk of adverse biological effects (ERM quotient greater than 0.5) due to the presence of these sediment constituents. These sediments are mainly located near the LA estuaries, marinas, and large POTWs.

Bioassessment

Bioassessments aid in the evaluation of the qualitative integrity of water bodies through the detection of biological responses and trends resulting from exposure to pollution within watersheds. Section II.G of the storm water monitoring permit requires LACDPW to perform regional bioassessments of the streams in Los Angeles County in October every year. Sampling sites are spread throughout each of the six major watersheds and are selected to represent the diverse environments of the Los Angeles region. Table 1-1 lists the sampling station locations and Figure 1-1 is a map showing the geographical location of the sampling stations. In addition to regional water quality assessment, information gathered from the biological surveys in Los Angeles County will be combined with data collected from surrounding counties to refine an Index of Biological Indicators for the Southern California region, if possible. For complete details, the final report from the previous year of the Bioassessment Monitoring Program (2005-2006) is included in Appendix H of this annual report.

SPECIAL STUDIES

As required by the 2001 Municipal Storm Water Permit, LACDPW, representing the Flood Control District, is conducting special monitoring programs, including the following:

New Development Impacts Study in the Santa Clara Watershed

The objective of the New Development Impacts Study in the Santa Clara Watershed is to evaluate the effectiveness of the Standard Urban Storm Water Mitigation Plan (SUSMP) Best Management Practices at reducing pollutants in storm water runoff.

The Regional Board, in a letter dated March 7, 2003, allowed the County and the City of Santa Clarita to fulfill this permit requirement by simulating the expected improvements from implementation of SUSMP through a mathematical modeling. On November 13, 2003, we submitted a work plan to the Regional Board. The US EPA's Storm Water Management Model (SWMM) will be used to conduct a deterministic hydrological modeling coupled with a stochastic Monte Carlo approach for modeling storm water runoff water quality.

A small watershed tributary to the Santa Clara River in the western side of the City of Santa Clarita was selected for monitoring and modeling. The 126-acre drainage area of this pre-SUSMP site includes a mix of residential and commercial land uses, and therefore met both the drainage area sizing and land use criteria for the modeling project.

A monitoring station and rain gage were installed at the outlet of the watershed. The station included a flow meter and automatic sampler. The equipment can be monitored remotely through the cell phone connection and hydrologic data are currently downloaded on a weekly basis.

Some of the activities to be conducted in the next reporting period include creation of the hydrologic network for SWMM model and compilation of initial series of BMP scenarios that will be modeled.

Peak Discharge Impact Study

The study was conducted to fulfill the requirement to develop numeric criteria for peak flow control by assessing the potential cause and effect relationships between urbanization in watersheds and stream erosion in Los Angeles County.

The SCCWRP and Los Angeles County Flood Control District were jointly conducting the study through a consultant contract. The study results were previously reported. The numeric criteria for peak flow control were developed and submitted in the previous reporting period.

BMP Effectiveness Study

The Municipal Stormwater Permit requires a study of the effectiveness of various BMPs. Five different types of BMPs have been chosen for this study. These BMPs included five catch basin inserts connected in series with a hydrodynamic separator downstream of these inserts in the City of South Pasadena, an enhanced manhole in one of Los Angeles County Public Works maintenance yards in the City of Los Angeles, a bioswale located in the City of Los Angeles inside a small public park, and a treatment train that consisted of a wet vault for oil and sediments separation followed by an infiltration trench inside a metal recycling recycling facility

in the City of Los Angeles. Monitoring started during the 2004-2005 season. Current activities include design and construction of flow measuring devices, installation of water samplers, and development of monitoring plans. It is anticipated that continuous deflective separator devices and metals filtration units will be monitored at the Sun Valley Park Project during the 2006-2007 season. The selected BMPs will be evaluated for effectiveness of removing various pollutants from stormwater runoff.

Recommendations

Monitoring components conducted during the 2005-2006 monitoring season included collecting two dry weather samples at each of the tributary monitoring stations as recommended in the 2002-2003 monitoring report. In addition, all required samples were taken, including dry weather and toxicity samples. The only exception was the lack of capture of composite samples at the Benedict Canyon Tributary Monitoring site due to mechanical issues. Below are some recommendations that were identified based on results of monitoring in the 2005-2006 monitoring season.

Many of the polychlorinated biphenyls, SVOCs (Semi Volatile Organic Compounds) , and chlorinated pesticides cannot be compared to the water quality standards because there are no standards listed in the Basin Plan, Ocean Plan, or CTR. However, even if there were water quality standards, none of these constituents were detected at any of the mass emission or tributary monitoring stations. We recommend discontinuing sampling for these constituents, except during the first storm event of every year.

Some constituents sampled at the tributary stations, particularly Total Copper and Total Zinc continued to show exceedances of water quality standards during this second year of monitoring. The Municipal Storm Water Permit requires the initiation of a focused effort to identify sources of pollutant within that sub-watershed when a constituent exceeds a water quality standard in three out of four samples. To identify the possible sources of these pollutants, LACDPW compared them with the water quality data collected from the land-use monitoring stations. The land-use of all tributary monitoring stations is predominantly high density single family residential. The land-use monitoring water quality data indicate that Total Copper and Total Zinc were also typically found from the same land-use, high density single family residential. Based upon two-years of monitoring at the Ballona Creek Tributary Monitoring sites, it is recommended that management actions be focused upon the Constituents of Concern in the Adams Drain, Cochran, and Centinela Creek watersheds for wet weather. For dry weather, it is recommended that management actions be focused upon the Constituents of Concern in the Adams Drain, Cochran, and Fairfax Drain watersheds.

As two seasons have been spent gathering data at Ballona Creek tributary monitoring sites, verifying results, it is recommended that tributary monitoring be moved to San Gabriel River tributaries for the 2006-2007 season.

In order to identify and better understand the source(s) of pollution, mass emission monitoring, toxicity monitoring, trash monitoring, and tributary monitoring will be continued in the future in addition to the regional monitoring and special studies, as required by the Municipal Storm Water Permit.