

# TENTATIVE

## CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD CENTRAL VALLEY REGION

ORDER NO. R5-2008-\_\_\_\_\_

NPDES NO. CAS082597

### MONITORING AND REPORTING PROGRAM

CITIES OF CITIRUS HEIGHT, ELK GROVE, FOLSOM, GALT, RANCHO CORDOVA,  
SACRAMENTO, AND COUNTY OF SACRAMENTO  
STORM WATER DISCHARGES FROM  
MUNICIPAL SEPARATE STORM SEWER SYSTEM  
SACRAMENTO COUNTY

#### I. **MONITORING AND REPORTING PROGRAM REQUIREMENTS**

This Monitoring Reporting Program (MRP) is issued pursuant to the California Water Code Section 13267 and 13383. This MRP is necessary to determine compliance with Order No. R5-2008-\_\_\_\_\_ and to determine the effectiveness of the storm water program.

The Permittees shall not implement any changes to this MRP unless and until the Regional Water Board or Executive Officer issues a revised MRP. Attachment A shows the individual Permittee municipal separate storm water system (MS4) limits known as the Sacramento urbanized area, which are covered under this Order. To save time and money, and avoid duplication of efforts, the Permittees shall coordinate their monitoring program with local, state, and federal agencies whenever possible.

- A. **Annual Monitoring Plan:** The Permittees shall submit by **1 May** of each year a proposed joint-Permittee Annual Monitoring Plan that includes clearly defined tasks, responsibilities, and schedules for implementation of monitoring activities for the next fiscal year. The Annual Monitoring Plan shall be deemed to be final and enforceable under this Order as of **1 July** of each year unless determined to be unacceptable by the Executive Officer. Each Permittee shall address any comments or conditions of acceptability received from the Executive Officer on the Permittees' Annual Monitoring Plan.
- B. **Annual Report:** The Permittees shall submit, in both electronic and paper formats and no later than **1 October** of each year, an Annual Report documenting the progress of the Permittees' implementation of the Storm Water Quality Improvement Plan (SQIP) and the requirements of this Order. The Annual Report shall discuss each Permittee's status of compliance with this Order and the SQIPs, including implementation dates for all time-specific deadlines should be included for each program area. If permit deadlines are

not met, the Permittees shall report the reasons why the requirement was not met and how the requirements will be met in the future, including projected implementation dates. It shall include a compilation of deliverables and milestones completed during the previous fiscal year, and a discussion of program effectiveness relative to performance standards defined in the SQIPs. In each Annual Report, the Permittees may propose pertinent updates, improvements, or revisions to the SQIPs, which shall be complied with under this Order unless disapproved by the Executive Officer or acted upon in accordance with this Order. A comparison of program implementation results to performance standards established in the SQIP and Order No. R5-2007-0173 shall be included for each program area. Specific requirements that must be addressed in the Annual Reports are listed below.

1. An Executive Summary discussing the effectiveness of the SQIP to reduce storm water pollution to the maximum extent practicable (MEP) and to achieve compliance with water quality standards in receiving waters;
2. Summary of activities conducted by the Permittees;
3. Identification of best management practices (BMPs) and a discussion of their effectiveness at reducing urban runoff pollutants and flow, where applicable; and
4. Summary of the monitoring data and an assessment of each component of the MRP. To comply with Provisions C.1 and C.2 of the Order No. R5-2008-\_\_\_\_ the Permittees shall compare receiving water data with applicable water quality standards. The lowest applicable standard from the Basin Plan, California Toxics Rule (CTR), and California Title 22 (Title 22), and constituent specific concentrations limits (e.g., mercury) shall be used for comparison. The Permittees shall additionally provide a summary of monitoring data for the discharges to assess the effectiveness of BMPs in reducing pollutants in the discharge and in assessing whether a discharge may have caused or contributed to an exceedance of water quality standards.

When the data indicate that discharges are causing or contributing to exceedances of applicable water quality standards or constituent specific concentrations limits, the Permittees shall prepare a Report of Water Quality Exceedance (RWQE), prepared pursuant to Receiving Water Limitations C.3 of this Order, and identify potential sources of the problems, and recommend future monitoring and BMP implementation measures to identify and address the sources.

Raw data shall be submitted in electronic format.

5. Effectiveness assessment for each program element, as defined in the SQIP, shall be conducted annually, shall be built upon each consecutive year, and shall identify any necessary modifications. The SQIP shall describe, in detail, the performance standards or goals to use to gauge the effectiveness of the storm water management program. The primary questions that must be assessed for each program element include the following:
  - a. Level 1 Outcome: Was the Program Element or BMP implemented in accordance with the Permit Provisions, SQIP Control Measures and Performance Standards?
  - b. Level 2 Outcome: Did the Program Element or BMP raise the target audience's awareness of an issue?
  - c. Level 3 Outcome: Did the Program Element or BMP change a target audience's behavior, resulting in the implementation of recommended BMPs?
  - d. Level 4 Outcome: Did the Program Element or BMP reduce the load of pollutants from the sources to the storm drain system?
  - e. Level 5 Outcome: Did the Program Element or BMP enhance or change the urban runoff and discharge quality?
  - f. Level 6 Outcome: Did the Program Element or BMP enhance or change receiving water quality?

Annually, the Permittees shall evaluate Water Quality Based Programs and shall include consideration of applicable physical, chemical and biological data water quality data. Such evaluation may include graphs, charts, statistics, modeling, and any other analyses in support of the Permittees' evaluation of the data and conclusions derived from that analysis. Documentation shall include quality assurance and control procedures (QA/QC).

6. Pursuant to 40 CFR 122.42(c)(7), the Permittees shall identify water quality improvements in, or degradation of, urban storm water;
7. For each monitoring component, photographs and maps of all monitoring station locations and descriptions of each location; and
8. Recommendations to improve the monitoring program, BMPs, Performance Standards, and the SQIP to address potential receiving

water quality exceedances and potential pollutant sources, and to meet the MEP standard.

9. Provide operating data from all pump stations as an appendix in electronic format as necessary and estimate discharge volumes unless other technically defensible means to estimate urban runoff discharge volumes can be substituted. Historically, the Permittees have estimated runoff volumes based on rainfall-runoff volume empirical relationships.
  10. In addition to the requirements listed above, the final Annual Report of this Order's permit term shall include:
    - a. An estimate of total pollutant loads attributable to urban runoff for target pollutants at each discharge monitoring station;
    - b. An evaluation of the long-term trends in MS4 discharges and receiving water quality. Several factors need to be considered when evaluating trends, such as changes in sample collection methods, data quality differences, and changes in analytical methods.
    - c. An evaluation of significant correlations of target pollutants with other constituents, such as total suspended solids (TSS).
  11. The SQIP shall include separate sections for specific program elements, as well as separate sections for Plans required by the Order (i.e., Sediment Monitoring, Mercury Plan).
- C. **Notification of Water Quality Exceedances (NWQE):** The Permittees shall notify the Regional Water Board, in writing, of any exceedance in receiving waters of applicable water quality standards within **90 days** of the monitoring event from which the exceedance was detected. The Permittees shall notify the Regional Water Board electronically within **48 hours** of receiving Water Column Toxicity monitoring data in receiving waters that indicates 50% mortality.
- D. **Certification:** All work plans and reports submitted to the Regional Water Board shall be signed and certified pursuant to federal regulations at 40 CFR 122.41 (k). Each report shall contain the following completed declaration:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted.

Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility, of a fine and imprisonment for knowing violations.”

Executed on the \_\_\_ day of, 200 \_\_, at \_\_\_\_\_.

(Signature)\_\_\_\_\_ (Title)\_\_\_\_\_.

The Permittees shall mail the original of each annual report to:

CALIFORNIA REGIONAL WATER QUALITY  
CONTROL BOARD – CENTRAL VALLEY REGION  
11020 SUN CENTER DRIVE, #200  
RANCHO CORDOVA, CA 95670

A copy of the annual report shall also be mailed to:

REGIONAL ADMINISTRATOR  
ENVIRONMENTAL PROTECTION AGENCY  
REGION 9  
75 Hawthorne Street  
San Francisco, CA 94105

## II. MONITORING PROGRAM

The primary objectives of the Monitoring Program are:

- Assessing compliance with this Order;
- Measuring and improving the effectiveness of the SQIPs;
- Assessing the chemical, physical, and biological impacts on receiving waters resulting from urban runoff;
- Characterization of urban runoff;
- Identifying sources of pollutants; and
- Assessing the overall health and evaluating long-term trends in receiving water quality.

Ultimately, the results of the monitoring requirements should be used to refine the SQIP to reduce pollutant loadings, and to protect and enhance the beneficial uses of the receiving waters in the Sacramento Urbanized Area.

The monitoring program shall address:

- **Baseline Monitoring**
  - Receiving Water Monitoring, including river and urban tributaries
  - Urban Discharge Monitoring
  - Water Column Toxicity Monitoring
- **Sediment and Bioassessment Monitoring**
- **Water Quality Based Programs**
  - Pesticide Monitoring
  - Mercury Monitoring
- **Special Studies**
  - Detention Basin Effectiveness Evaluation Monitoring
  - Pilot Watershed – New Development BMP Effectiveness Evaluation
  - Proprietary Treatment BMP Effectiveness Evaluation

The Permittees shall implement the Monitoring Program as follows:

**A. Sampling Protocol**

1. Sampling events should be coordinated with monitoring activities such as receiving water monitoring (river and urban tributary), and urban discharge.
2. The Permittees shall collect flow data at the time of sampling for all monitoring stations sampled. Receiving water or urban discharge flow may be estimated using U.S. EPA methods<sup>1</sup> at sites where flow measurement devices are not in place.
3. All sample collection and analyses shall follow standard USEPA protocol.
4. To meet a monitoring requirement, the Permittees may support (financially or otherwise) another agency or monitoring program that will conduct the monitoring.

**B. Receiving Water Monitoring**

The new receiving water monitoring requirements described herein will require the Permittees to establish new monitoring stations, develop new operating procedures, and train personnel as described in the SQIP.

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<sup>1</sup> NPDES Storm Water Sampling Guidance Document, U.S. EPA 833-B-92-001, July 1992

The proposed locations of receiving water monitoring stations for rivers and urban tributaries shall be presented in the revised SQIP and presented in the Annual Reports. If additional monitoring stations are needed, they shall be established under the direction of Regional Water Board staff. A description of any additional stations shall be attached to this MRP. Receiving water monitoring may be postponed if a given monitoring station cannot be safely accessed.

Each year (annually), samples shall be collected **during three storm events<sup>2</sup>** and **one monitoring event during the dry season.<sup>3</sup>** The Permittees shall target monitoring the first rain event of the year forecasted for at least 0.25 inch in a twenty-four hour period that is preceded by at least 30 days of dry weather. The second and third rain events to be monitored shall be selected by the Permittees to fill data gaps for different types of rain events in the region. These rain event selection criteria shall be included in the sampling and analysis plans.

Receiving water monitoring for Rivers and Urban Tributaries shall be consistent with the attached Table B list of constituents of concern, except for pyrethroid pesticides in water.

1. **River Monitoring:** Monitoring of river receiving water stations shall be conducted at: American River at Nimbus, American River at Discovery Park, Sacramento River at Veteran's Bridge, and Sacramento River at Freeport Bridge, as shown on Attachment B. Monitoring shall be conducted in a manner that best measures the maximum anticipated water quality impacts from MS4 discharges. However, because of safety reasons, samples will be collected during daylight hours, only when conditions are safe for boat operations.

Samples collected at the American River at Nimbus location shall be collected as grab samples. All other river samples shall be cross-sectional depth-composite samples, unless a particular parameter analysis requires grab samples, or if flow and safety conditions warrant the collection of grab samples.

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<sup>2</sup> Storm Event means any rain event greater than 0.25 inch in 24 hours except where specifically stated otherwise.

<sup>3</sup> Dry weather day means a day with a rain event too small to generate runoff (typically 0.1 inches or less) shall be considered a dry weather day.

## 2. **Urban Tributary Monitoring:**

- a. Monitoring of urban tributary receiving waters shall be conducted at: Arcade Creek, Willow Creek and Laguna Creek, as shown on Attachment B.
  - i. If a given tributary is dry or has only standing water during a scheduled sampling event, then sampling is not required; however, Permittees shall attempt to sample tributaries at times when water flows are more likely, such as the early part of the dry season.
  - ii. Tributary receiving water samples shall be either grab, time-composited, or flow-composited and collected at mid-depth and mid-stream.
  - iii. Samples shall be taken just upstream of the tributary's confluence with the main stem of creeks or rivers.
  - iv. Sample collection can be limited to daylight hours, when conditions are safe.
- b. Report of Water Quality Exceedance (RWQE) preparation during the previous permit term included development of a work plan to address the cause and nature of dissolved oxygen (DO), pH, and temperature exceedances in several urban tributaries. Multiple steps in the work plan have been completed.<sup>4 5 6</sup> The Permittees shall continue to implement the work plan elements and begin Phase II upon adoption of this Order. Much of the work shall be performed in Morrison Creek, other creeks may be identified. The work plan and any updates to the plan shall be included in the SQIP.

## C. **Urban Discharge Monitoring**

The Permittees shall monitor urban discharges from the following monitoring stations: Sump 111, Strong Ranch Slough, and the North Natomas Development, as shown on Attachment B, for those constituents listed in Table B. The change from monitoring at the long term Sump 104 site to the

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<sup>4</sup> Larry Walker Associates, September 20, 2006. Memorandum from Brian Laurenson, *Assessment Strategy for Dissolved Oxygen, Temperature and pH in Sacramento Urban Tributaries*.

<sup>5</sup> Larry Walker Associates, November 13, 2006. Memorandum from Brian Laurenson. *Urban Tributary Dissolved Oxygen, pH and Temperature Investigation Sampling and Analysis Plan – Phase 1*.

<sup>6</sup> Larry Walker Associates, May 2007. Memorandum from Iain Clark. *Phase 1 Investigation Results – Willow Creek and Morrison Creek pH, Dissolved Oxygen, and Temperature*.

North Natomas Development site will be evaluated to determine effects on long term effectiveness evaluations. Following this evaluation and the finalization of the new location, if an alternate location is identified to replace Sump 104, the Permittees may request such a change through modification of the SQIP.

Sampling of pyrethroids in water as listed in Table B shall be conducted if required by Regional Water Board staff after evaluating the results and recommendations from the sampling of Permittee discharges currently being conducted by Dr. Donald Weston through Statewide Ambient Monitoring Program (SWAMP).

In coordination with Receiving Water Monitoring, in two of every three years, samples shall be collected **during three storm events** and **one dry season monitoring event**. The Permittees shall target for monitoring the first storm event of the year preceded by at least 30 days of dry weather.<sup>7</sup> The second and third storm events to be monitored shall be selected by the Permittees to fill data gaps for different types of storm events in the region.

Samples shall be flow-weighted composites collected for the duration of the storm, with a maximum composite period of 24 hours. Because of the inherent difficulty in fully capturing an entire storm event, the Permittees shall report the portion of the storm event "captured" or during which samples were collected.

#### D. **Water Column Toxicity**

The Permittees shall conduct short-term toxicity analyses to evaluate the extent and causes of toxicity in receiving waters, and to provide information to support identification of practices that eliminate sources of toxicity or remove them to the MEP.

The Permittees shall conduct toxicity testing at each receiving water monitoring station during two of the five fiscal years (July 1 of the current year to June 30 of the following year) of the Order; this testing shall not be done in consecutive years. Toxicity testing includes (1) analysis of samples from two storm events (including the first storm of the year) and one during the dry season from each receiving water monitoring station; and (2) analysis of at least the following two freshwater test species for each storm event: Fathead minnow (*Pimephales promelas*) and water flea (*Ceriodaphnia dubia*). The testing shall be conducted in accordance with U.S. EPA's method 821-R-02-

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<sup>7</sup> A day with a rain event too small to generate runoff (typically 0.1 inches or less) shall be considered a dry weather day.

013 (U.S. EPA 2002, 4th Edition). A modification<sup>8</sup> to this method is allowed for *Pimephales promelas* to address previously observed pathogen interference. A minimum sample volume of 5 gallons for each test species shall be provided with a sample storage (holding time) not to exceed 36 hours.

If 100% mortality to *Pimephales promelas* or *Ceriodaphnia dubia* is detected within 24 hours of test initiation, then a dilution series shall be initiated (0.5x steps) ranging from the undiluted sample (or the highest concentration that can be tested within the limitations of the test methods or sample type) to less than or equal to 6.25 percent of the sample. Further, if statistically significant toxicity is detected and a greater than or equal to 50% increase in *Pimephales promelas* or *Ceriodaphnia dubia* mortality compared to the laboratory control is observed, then TIEs shall be conducted on the initial sample that caused toxicity.

1. Toxicity Identification Evaluations (TIE)

The Permittees shall begin a Phase I TIE immediately on all samples that cause statistically significant toxicity and greater than or equal to 50% increase in *Pimephales promelas* or *Ceriodaphnia dubia* mortality compared to the laboratory control. If mortality of both test species exceeds the 50% trigger, then TIEs shall be conducted using both species. TIEs are required until the cause of toxicity is determined. TIE shall be conducted by qualified personnel.

2. Toxicity Reduction Evaluations (TRE)

- a. A TRE shall be conducted whenever a toxicant is successfully identified through the TIE process. The TRE shall include all reasonable steps to identify the source(s) of toxicity and discuss appropriate BMPs to eliminate the causes of toxicity. Once the source of toxicity and appropriate BMPs are identified, the Permittees shall submit the TRE Corrective Action Plan as part of the Annual Report to the Executive Officer for approval. At a minimum, the TRE shall include a discussion of the following items:
  - i. A description of the investigation and evaluation techniques that would be used to identify potential causes and sources of toxicity;

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<sup>8</sup> Geis, Stephen W., et al., *Modifications to the Fathead Minnow (Pimephales promelas) chronic Test Method to Remove Mortality Due to Pathogenic Organisms*. Environmental Toxicology and Chemistry. Vo.. 22 No. 10. Pg. 2400-2404. April 2003.

- ii. The potential sources of pollutant(s) causing toxicity;
  - iii. A list of Permittees having jurisdiction over sources of pollutant(s) causing toxicity;
  - iv. Recommended BMPs to reduce the pollutant(s) causing toxicity;
  - v. Proposed changes to the SQIP to reduce the pollutant(s) causing toxicity; and
  - vi. Suggested follow-up monitoring to demonstrate BMP effectiveness in reducing the pollutant causing toxicity.
- b. The Permittee's do not need to prepare a TRE if the identified pollutant is already being addressed in the Permittee's Target Pollutant Program. If this is the case, the toxicity found shall be noted and addressed through on-going implementation of that pollutant control strategy.
  - c. If TRE implementation for a specific pollutant coincides with Total Maximum Daily Load (TMDL) implementation for that pollutant, the efforts may be coordinated.
  - d. Upon approval by the Executive Officer, the Permittees(s) having jurisdiction over sources causing or contributing to toxicity shall implement the recommended BMPs and take all reasonable steps necessary to eliminate toxicity.
  - e. The Permittees shall develop a maximum of two TREs per year. If applicable, the Permittees may use the same TRE for the same toxic pollutant or pollutant class in different watersheds or basins. The TRE process shall be coordinated with TMDL development and implementation to avoid overlap.

The Permittees shall include a monitoring plan, which shall include a sampling and analysis plan and an implementation schedule in the SQIP for approval by the Executive Officer. Subsequent information (e.g., all data (electronic format), assessment of the data, conclusions, proposed BMPs to be implemented, and assessment of program effectiveness) shall be included in the Annual Reports as required in this MRP Order.

### E. Sediment Monitoring

1. Sediment toxicity resulting from pyrethroid pesticides was recently identified in a study<sup>9</sup> performed through Statewide Ambient Monitoring Program (SWAMP) monitoring in the Sacramento area (Roseville, CA) urban tributaries. The Permittees will conduct pyrethroid sediment sampling as part of the urban tributary monitoring and as part of any bioassessment sampling. Sampling of sediment shall be consistent with SWAMP Quality Assurance Management Plan (QAMP) protocols. Specifically, **one wet season**<sup>10</sup> **and one dry season** sample will be collected annually at least five years at each of the three urban tributaries. Reporting limits in sediment will conform to Table B. Sediment toxicity sampling is not required under this Order. These requirements may change based on an evaluation of data performed by the Permittees.
2. The Permittees shall review and amend the Pesticide Plan component of the SQIP, if pesticides in sediments are identified as causing or contributing to receiving water impacts.

The Pesticide Plan shall address the following elements:

- a. Identification, development, implementation and assessment of BMPs to address controllable discharges of sediment-bound contaminants that may be linked to sediment toxicity to the MEP;
- b. Development and adoption of policies, procedures, and/or ordinances to implement BMPs;
- c. A time schedule for implementation and assessment.

### F. Bioassessment Monitoring

The purpose of this requirement is to fully evaluate biological data collected under the previous MRP in order to assess the biological integrity of receiving waters, detect biological responses to pollution, and identify probable causes of impairment not detected by chemical and physical water quality analysis.

Further bioassessment monitoring activities will not be required under this Order until the evaluation with recommendations is complete, and the monitoring effort is adapted in consultation with SWAMP's bioassessment

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<sup>9</sup> Weston, D. P., Holmes, R. W., et.al. Aquatic Toxicity Due to Residential Use of Pyrethroid Insecticides. Environmental Science and Technology. 2005, 39, 9778-9784.

<sup>10</sup> Wet Season means the calendar period beginning October 1 through April 15.

workgroup. If applicable, an updated bioassessment monitoring plan shall be included in the SQIP.

1. The following results and information shall be included in the 2008-09 Annual Report:
  - a. All physical, chemical and biological data collected in the assessment;
  - b. Photographs and GPS locations of all stations;
  - c. Documentation of quality assurance and control procedures;
  - d. Analysis that shall include calculation of the metrics used in the CSBP;
  - e. Comparison of mean biological and habitat assessment metric values between stations and year-to-year trends;
  - f. Electronic data formatted to the DFG Aquatic Bioassessment Laboratory for inclusion in the Statewide Access Bioassessment Database; and
  - g. Copies of all QA/QC documents from laboratories.
2. The Permittees shall participate in and coordinate with the SWAMP to identify the most appropriate locations for future bioassessment stations within the Sacramento urbanized area and determine coordinated needs for the initial development of an Index of Biological Integrity for the region.

#### G. **Water Quality-Based Programs**

The following minimum requirements shall apply to the specified programs:

1. **Additional Pesticide Monitoring.** Additional pesticide monitoring shall be developed to comply with the Basin Plan amendments or TMDLs developed during the Permit term and will be proposed in the Permittees Annual Work Plans submitted to the Regional Water Board.
2. **Additional Total Mercury and Methylmercury Analyses.** Previous monitoring included the analysis of total mercury and methylmercury at a variety of urban tributaries and urban discharge stations during a range of weather conditions and storm events. The Permittees shall fully evaluate total mercury and methylmercury data collected under the previous MRP in order to determine average annual methylmercury and total mercury concentrations and loads discharged to the CWA 303(d) Listed mercury-impaired waterways by urban lands in the Sacramento Urbanized Area during a range of wet and dry years.

The following results and information shall be included in the **2008/2009 Annual Report**:

- a. A summary of all total mercury, methylmercury and TSS water column data collected at urban tributaries and urban discharge stations by previous MRPs.
- b. GPS locations of all tributary and urban discharge stations;
- c. Documentation of sample collection and analytical methods;
- d. Documentation of quality assurance and control procedures;
- e. Evaluation of whether the (1) available concentration data represents a range of storm conditions and normal, above- and below-average wet and dry years (as determined by the DWR Water Year Hydrologic Classification Indices<sup>11</sup> for the Sacramento River Basin or other comparable methods); and (2) sampling locations represent runoff from urban lands throughout the Sacramento Urbanized Area that contribute discharge to each of the mercury-impaired waterways (Delta, Sacramento River, American River, and Lake Natoma).
- f. Evaluation of available data and methods to estimate dry- and wet-weather discharge volume (flow) from urban lands in the Sacramento Urbanized Area (e.g., LWA, 1996;<sup>12</sup> Ruby, 2005<sup>13</sup>) that will be needed to calculate the annual average total mercury and methylmercury loads in urban runoff contributed to each of the mercury-impaired waterways. Evaluation shall include the identification of a preferred method for estimating runoff volume, calculation of annual average discharge volumes contributed by urban lands within the Sacramento Urbanized Area to each of the mercury-impaired waterways using the preferred and alternative methods, and identification of any needs for additional data to better estimate annual runoff volumes.

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<sup>11</sup> DWR. 2006. Chronological Reconstructed Sacramento and San Joaquin Valley Water Year Hydrologic Classification Indices. DWR California Cooperative Snow Surveys. Sacramento, CA. Available at: <http://cdec.water.ca.gov/cgi-progs/ioidir/WSIHIST>.

<sup>12</sup> LWA. 1996. Sacramento NPDES Stormwater Discharge Characterization Program 1996 DCP Update Report. Prepared by Larry Walker Associates (LWA) for the County of Sacramento, the City of Sacramento, the City of Folsom, and the City of Galt. September 1996.

<sup>13</sup> Ruby, A. 2005. Sacramento Urban Runoff Discharge Characterization 2005. Prepared for: The Sacramento Stormwater Quality Partnership. Prepared by: Armand Ruby, Armand Ruby Consulting, in association with Larry Walker Associates Inc. August 2005.

- g. Evaluation of different methods to estimate total mercury and methylmercury loads contributed to each of the mercury-impaired waterways by Sacramento Urbanized Area urban runoff (e.g., Ruby, 2005; Laurenson, 2007<sup>14</sup>; Wood et al., 2008<sup>15</sup>) and identification of a preferred method.
- h. Identification of data gaps and recommendations for additional monitoring or weather-specific sampling events necessary to fully characterize annual average total mercury and methylmercury concentrations and loads in runoff from established urban areas and new urban developments that contribute discharge to each of the mercury-impaired waterways. Recommendations may include a monitoring time schedule (e.g., when the monitoring will begin and its frequency) and will be developed in coordination with TMDL development and implementation for the Delta, Sacramento River, American River, and Lake Natoma.
- i. Estimates of the amount of total mercury and sediment prevented from discharging to receiving waters by existing BMPs in the Sacramento Urbanized Area such as, but not limited to, street cleaning, detention basins, and erosion and sediment controls.
- j. Recommendations for including total mercury and methylmercury monitoring in the design of future BMP studies to estimate the extent to which existing and new BMPs reduce total mercury and reduce and/or increase methylmercury discharges.

The baseline monitoring described in Section II.B of this MRP includes total mercury and methylmercury for three urban tributaries: Arcade Creek, Willow Creek and Laguna Creek. In addition, the monitoring described in Section II.C includes total mercury and methylmercury for three urban discharge stations: Sump 111, Strong Ranch Slough, and North Natomas Development Sump. Section III.A of this MRP also requires monitoring of methylmercury and total mercury in water in a special study to assess the pollutant removal performance of representative detention basins.

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<sup>14</sup> Laurenson, B.M. 2007. Report of Waste Discharge – Discharge and Receiving Water Characterization. Memorandum and summary statistics prepared by Brian M. Laurenson, P.E. (Larry Walker Associates) for Delia McGrath (City of Sacramento) and Janet Parris (Sacramento County).

<sup>15</sup> Wood, M.L., C.G. Foe, J. Cooke, S.J. Louie, and D.H. Bosworth. 2008. Sacramento – San Joaquin Delta Estuary TMDL for Methylmercury – Draft Report for Public Review. Central Valley Regional Water Quality Control Board staff report, February 2008.

Total mercury and methylmercury monitoring activities may be modified pending the Permittees' evaluation in the 2008/09 Annual Report. Any changes to the Monitoring Program will be made in consultation with Regional Water Board MS4 and Mercury TMDL staff, and in coordination with the final Delta TMDL and TMDL development efforts for the American River, Sacramento River, and Lake Natomas. The Executive Officer may require SQIP revisions based on the results of the above mercury-related evaluations and Permittee and Regional Water Board staff recommendations.

### III. SPECIAL STUDIES

#### A. Wet Detention Basin Monitoring

1. The Permittees shall complete the Water Quality Detention Basin Effectiveness study initiated in the last permit term to assess the pollutant removal performance of a representative wet water quality detention basin.
2. As described in Table B, the Permittees shall conduct monitoring for the following constituents in the water column at the inlet and outlet: pyrethroids, total mercury, and methylmercury, total suspended solids (TSS), turbidity, and bacteria. All samples will be analyzed using the methods and minimum levels as described in Table B. Other constituents that shall be sampled include: bacteria, total dissolved solids (TDS), and organophosphate pesticides (chlorpyrifos and diazinon), as described in Table B.
3. The study shall be designed to perform inflow and outflow monitoring to measure removal effectiveness, which is representative of typical conditions within the Sacramento urban watershed. Monitoring shall be designed to evaluate the effectiveness of the detention basin in removing pollutants of concern.
4. For a minimum of three years (annually), inlet and outlet samples shall be collected during **three storm events** and **one dry season event** for a total of nine storm events and three dry events. The study may be completed sooner if more storm events can be sampled in a given year.
5. Monitoring summaries will be reported in each Annual Report.
6. The monitoring results shall be evaluated and submitted with the FY 2010/2011 Annual Report. The report shall include an evaluation of basin effectiveness in removing pollutants of concern, including methylmercury. The report shall include a recommendation for collecting

inlet and outlet grab samples at two other detention basins. The two additional detention basins shall be located in watersheds outside the North Natomas area. The results will be submitted to the Regional Water Board in the final Annual Report of the permit term.

7. If the detention basins are found to be ineffective, the Study shall be updated to include recommendations on how to manage or design detention basins differently (i.e., redesign new basins, reconfigure existing basins, periodic dredging).
8. An addendum to the 2010/2011 Wet Detention Basin Effectiveness Report, including the results of the additional detention basin monitoring, shall be submitted in the final Annual Report of the permit term.

**B. Sampling Schedule**

The monitoring program shall implement the sampling schedule shown in Table A;

**TABLE A. SAMPLING SCHEDULE**

<b>MRP Section Reference</b>	<b>Type</b>	<b>Sites</b>	<b>No. Sites</b>	<b>Permit Years Monitored</b>	<b>Total Events Over 5 Year Permit Term at Each Site</b>	<b>Constituent List [1]</b>	<b>Management Goals Addressed [2]</b>	<b>Notes</b>
II.B.1.	River	Sacramento River (2) and American River (2)	4	Years 1 through 5	15 Wet, 5 Dry	Table B. No pyrethroids in water column, pending evaluation.	A, F	3 Wet, 1 Dry per year  Sites located upstream and downstream of Sacramento urban area.
II.B.2.	Urban Tributary	Arcade Creek, Willow Creek, and Laguna Creek	3	Years 1 through 5	15 Wet, 5 Dry	Table B. No pyrethroids in water column, pending evaluation. Sediment monitoring described in MRP section II.E.	A, F	3 Wet, 1 Dry per year  The long term Laguna Creek urban tributary monitoring site will be within an existing developed area of the watershed.
II.C.	Urban Discharge Monitoring	Sump 111, Strong Ranch Slough, North Natomas	3	Years 1, 2, 4, & 5	12 Wet, 4 Dry	Table B. No pyrethroids in water column, pending evaluation.	C, D, E, G	3 Wet, 1 Dry per year  North Natomas site replaces Sump 104 pending data review and site selection. Monitoring in two of every three years.

**TABLE A. SAMPLING SCHEDULE**

<b>MRP Section Reference</b>	<b>Type</b>	<b>Sites</b>	<b>No. Sites</b>	<b>Permit Years Monitored</b>	<b>Total Events Over 5 Year Permit Term at Each Site</b>	<b>Constituent List [1]</b>	<b>Management Goals Addressed [2]</b>	<b>Notes</b>
II.D.	Water Column Toxicity	Sacramento River (2), American River (2), Arcade Creek, Willow Creek, and Laguna Creek	7	Years 2 and 4	4 Wet, 2 Dry	Fathead and Ceriodaphnia	A, E, F, G	2 Wet, 1 Dry per year  Targeted TIE triggered based on 50% mortality.
II.E.	Sediment	Urban Tributary Monitoring Sites	3	Years 1 through 5	5 Wet, 5 Dry	Pyrethroids	A, E, F, G	1 Wet, 1 Dry per year  Wet event to be performed directly following a wet weather urban tributary event, and no later than April
II.F.	Bioassessment	Arcade Creek, Willow Creek, and Laguna Creek	3	None Required. See Notes.	None Required. See Notes.	None Required. See Notes.	A, C, F, G	May be added at Permittee's discretion.
III.A.	Wet Detention Basin	North Natomas	2	Years 1, 2, & 3	9 Wet, 3 Dry	Water column monitoring includes total mercury, methylmercury, TSS, bacteria, turbidity, TDS, OP pesticides, and pyrethroids.	B, C, D, E, F, G	3 Wet, 1 Dry per year  Monitoring initiated in 2007/08. Water column monitoring at inlet and outlet. Additional sampling of two more basins post 2010/2011 report.
III.B.	Pilot Watershed	Laguna Creek New Development BMP Effectiveness Evaluation	1	After year 2	None Required. See Notes.	None Required. See Notes.	B, D, E, G	Monitoring frequency, constituents, and sites to be determined during development of monitoring work plan in 2008/09.

Notes:

[1] "Table B" refers to the MRP constituent list that includes, among other constituents, total mercury, methyl mercury, and TSS.

[2] Management Goals

- A. What is the existing condition of receiving water quality and is it protective of beneficial uses?
- B. What is the quality of urban discharge in new developed areas?
- C. What is the trend of urban discharge quality?
- D. What is the relative urban runoff contribution to receiving water quality?
- E. What are the sources to urban runoff that affect receiving water quality?
- F. Are conditions in receiving waters getting better or worse?
- G. How can changes in urban water quality affect receiving water quality?

**C. Pilot Watershed – New Development BMP Effectiveness Evaluation**

1. The Permittees shall prepare and implement a work plan over the permit term for monitoring a receiving water site within the Upper Laguna Creek Collaborative project area. The work plan shall be submitted as part of the revised SQIP.

The objective of the study shall include the following:

- a. Monitor the reduction of pollutants of concern in storm water including, but not limited to, pathogen indicators, nutrients, heavy metals (including total mercury and methylmercury), and pesticides from a minimum of one BMP (e.g., low impact development) to determine BMP effectiveness;
- b. Evaluate the requirements for and installation and maintenance cost of each BMP; and
- c. Develop recommendations for appropriate BMPs for the reduction of pollutants of concern in storm water in the Sacramento urbanized area.

**D. Proprietary Treatment BMP Effectiveness Evaluation**

The Permittees shall continue to research the effectiveness and applicability of proprietary structural treatment BMPs for use in the Sacramento urbanized area. This study will include the review of manufacturer's field test data to verify their claims of product performance. This study shall be conducted a minimum of once per permit term.

**IV. Standard Monitoring Provisions**

All monitoring activities shall meet the following requirements:

- A. Monitoring and Records [40 CFR 122.41(j)(1)]

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

- B. Monitoring and Records [40 CFR 122.41(j)(2)] [California Water Code §13383(a)]

The Permittees shall retain records of all monitoring information, including all calibration and maintenance of monitoring instrumentation, copies of all

reports required by this Order, and records of all data used to complete the Report of Waste Discharge and application for this Order, for a period of at least five (5) years from the date of the sample, measurement, report, or application. This period may be extended by request of the Regional Water Board or U.S. EPA at any time and shall be extended during the course of any unresolved litigation regarding this discharge.

C. Monitoring and Records [40 CFR 122.41(j)(3)]. Records of monitoring information shall include:

1. Date, location, and time of sampling or measurements;
2. Individual(s) who performed the sampling or measurements;
3. Date analyses were performed;
4. Individual(s) who performed the analyses;
5. The analytical techniques or methods used; and
6. Results of such analyses.

D. Monitoring and Records [40 CFR 122.41(j)(4)]

All sampling, sample preservation, and analyses must be conducted according to test procedures approved under 40 CFR Part 136, unless otherwise specified in this Order.

E. Monitoring and Records [40 CFR 122.41(j)(5)]

The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this Order shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than two years, or both. If a conviction is for a violation committed after a first conviction under this paragraph, punishment shall be a fine of not more than \$20,000 per day of violation, or by imprisonment for not more than two years, or both.

F. All chemical, bacteriological, and toxicity analyses shall be conducted at a laboratory certified for such analyses by an appropriate governmental regulatory agency.

G. For priority toxic pollutants that are identified in the CTR (65 Fed. Reg. 31682), the MLs published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California - 2000 (SIP) shall be used for all analyses, unless otherwise specified. Appendix 4 of the SIP is included in Table B. For pollutants not contained in Appendix 4 of the SIP, the test method and method detection limit (MDL) listed in Table B shall be used for all analyses, and the ML for these parameters shall be lower than or equal to the lowest applicable water quality criteria from the Basin Plan and/or the Inland Surface Waters Plan.

- H. The Monitoring Report shall specify the analytical method used, the MDL and the ML for each pollutant. For the purpose of reporting compliance with numerical limitations, performance goals, and receiving water limitations, analytical data shall be reported with one of the following methods, as appropriate:
1. An actual numerical value for sample results greater than or equal to the ML;
  2. "Not-detected (ND)" for sample results less than the laboratory's MDL with the MDL indicated for the analytical method used; or
  3. "Detected, but Not Quantified (DNQ)" if results are greater than or equal to the laboratory's MDL but less than the ML. The estimated chemical concentration of the sample shall also be reported. This is the concentration that results from the confirmed detection of the substance by the analytical method below the ML value.
  4. For priority toxic pollutants, if the Permittees can demonstrate that a particular ML is not attainable, in accordance with procedures set forth in 40 CFR 136, the lowest quantifiable concentration of the lowest calibration standard analyzed by a specific analytical procedure (assuming that all the method specified sample weights, volumes, and processing steps have been followed) may be used instead of the ML listed in Appendix 4 of the SIP. The Permittees must submit documentation from the laboratory to the Executive Officer for approval prior to raising the ML for any constituent.
- I. Monitoring Reports [40 CFR 122.41(l)(4)(ii)]
- If the Permittees monitor any pollutant more frequently than required by the permit using test procedures approved under this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Annual Report.
- J. Monitoring Reports [40 CFR 122.41(l)(4)(iii)]
- Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order.
- K. If no flow occurred during the reporting period, the Monitoring Report shall so state.

- L. The Executive Officer or the Regional Water Board, consistent with 40 CFR 122.41, may approve changes to the Monitoring Program, after providing the opportunity for public comment, either:
1. By petition of the Permittees, or by petition of interested parties, after the submittal of the Annual Report (such petition shall be filed not later than 60 days after the Annual Report submittal date), or
  2. As deemed necessary by the Executive Officer following notice to the Permittees.

Ordered by \_\_\_\_\_

PAMELA C. CREEDON, Executive Officer

\_\_\_\_\_  
Date

Attachments: Table B – List of Constituents  
Attachment A – Permit Area Map  
Attachment B – Monitoring Locations Map  
Attachment C – Definitions  
Attachment D – Standard Provisions and Reporting Requirements  
(February 2004)

**TABLE B. LIST OF CONSTITUENTS AND ASSOCIATED MINIMUM LEVELS  
(MLs)<sup>16</sup>  
FOR THE STORM WATER AND URBAN DISCHARGE  
MONITORING PROGRAM**

<b>CONSTITUENTS</b>	<b>MLs</b>
<b>FIELD/LAB MEASUREMENTS</b>	
Date	mm/dd/yyyy
Sample Time	hr:min (regular time)
Weather	degrees F
Water Temperature	degrees C
pH	0 – 14
Dissolved Oxygen	Sensitivity to 5 mg/L
Turbidity	0.1 NTU
Electrical Conductivity (EC)	µmhos/cm
<b>BACTERIA</b>	
Fecal coliform	<20mpn/100ml
E. coli (fresh waters)	<20mpn/100ml
<b>GENERAL</b>	
	<b>mg/L</b>
Total Petroleum Hydrocarbons	5
Total Suspended Solids	2
Total Dissolved Solids	2
Total Organic Carbon	1
Dissolved Organic Carbon	1
Biochemical Oxygen Demand	2
Chemical Oxygen Demand	20-900
Total Kjeldahl Nitrogen	0.1
Alkalinity	2
Nitrate-Nitrite	0.1
Total Phosphorus	0.05
Total Hardness	2
Methylmercury	0.05 ng/L

<sup>16</sup> For Priority Pollutants, the MLs represent the lowest value listed in Appendix 4 of SIP. Method Detection Limit (MDLs) must be lower than or equal to the ML value. If a particular ML is not attainable in accordance with procedures set for in 40 CFR 136, the lowest quantifiable concentration of the lowest calibration standard analyzed by a specific analytical procedure may be used instead.

CONSTITUENTS	MLs
<b>METALS</b>	<b>µg/L</b>
Copper, Dissolved	0.5
Copper, Total	0.5
Iron, Total	100
Lead, Dissolved	0.5
Lead, Total	0.5
Mercury, Total	0.5 ng/L
Zinc, Dissolved	1
Zinc, Total	1
<b>ORGANOPHOSPHATE PESTICIDES</b>	<b>µg/L</b>
Chlorpyrifos	0.01
Diazinon	0.05
Malathion	0.05
<b>SEMI- AND NON-VOLATILE ORGANICS</b>	<b>µ g/L</b>
Perylene	0.005
Benz[a]anthracene	0.005
Chrysene	0.005
Fluorene	0.005
Benzo[b]fluoranthene	0.005
Benzo[e]pyrene	0.005
Benzo[k]fluoranthene	0.005
Benzo[a]pyrene	0.005
Indeno[1,2,3-c,d]pyrene	0.005
Dibenz[a,h]anthracene	0.005
Benzo[g,h,i]perylene	0.005
Pyrene	0.005
Acenaphthylene	0.005
Acenaphthene	0.005
Naphthalene	0.005
2-Methylnaphthalene	0.005
1-Methylnaphthalene	0.005
2,6-Dimethylnaphthalene	0.005
2,3,5-Trimethylnaphthalene	0.005
Fluoranthene	0.005
Phenanthrene	0.005
Anthracene	0.005
1-Methylphenanthrene	0.005

<b>CONSTITUENTS</b>	<b>MLs</b>
<b>PYRETHROID PESTICIDES IN SEDIMENT</b>	<b>Target Reporting Limit (ng/g)<sup>2</sup></b>
Bifenthrin	2
Cyfluthrin	4
Cypermethrin	4
Deltamethrin/Tralomethrin	4
Esfenvalerate/Fenvalerate	2
Fenpropathrin	4
Lambda-cyhalothrin	4
Permethrin	8
The following analysis would only be required if monitoring results from the studies investigating the Pelagic Organism Decline in the Delta indicate these concentrations are present and of concern in Sacramento Permittee discharges	
<b>PYRETHROID PESTICIDES IN WATER<sup>3</sup></b>	<b>Target Reporting Limit ppb (ug/L)<sup>2</sup></b>
Bifenthrin	0.002
Cyfluthrin	0.004
Cypermethrin	0.004
Deltamethrin/Tralomethrin	0.004
Esfenvalerate/Fenvalerate	0.002
Fenpropathrin	0.004
Lambda-cyhalothrin	0.002
Permethrin	0.005

<sup>2</sup> Acceptable method should generally be able to meet the minimum level target, however, the method detection limit (MDL) reported should be equal to or less than the listed target.

<sup>3</sup> Unfiltered, grab sample using glass jars