10.0 Implementation Monitoring Plan

This section describes an Implementation Monitoring Plan to assess the success of the implementation action plan presented in Section 9 in 1) achieving the nutrient wasteload and load reductions and 2) attaining nutrient water quality objectives in Rainbow Creek. The plan assigns monitoring responsibilities and describes a schedule and key milestones.

10.1 Regulatory Authority

10.1.1 Implementation Monitoring Plan as Part of a TMDL Basin Plan Amendment

Basin Plans must have a program of implementation to achieve water quality objectives[1]. The implementation program must include a description of actions that are necessary to achieve water quality objectives, a time schedule for these actions, and a description of "surveillance" to determine compliance with the water quality objectives[2]. The term "surveillance " in a TMDL context refers to an implementation monitoring plan designed to measure the effectiveness of the TMDL point and nonpoint source control measures and the progress the waterbody is making toward attaining water quality objectives. Such a plan would necessarily include collection of water quality data. State law requires that a TMDL include an implementation monitoring plan because the TMDL normally is, in essence, an interpretation or refinement of an existing water quality objective. The TMDL must be incorporated into the Basin Plan[3], and, because the TMDL supplements, interprets, or refines an existing water quality objective, state law requires an implementation monitoring plan be included to determine the success of the implementation action plan measures.

10.1.2 Local Agency Monitoring

CWC §13225 provides authority for the Regional Board to require local agencies such as the County of San Diego to submit technical reports on water quality control, even though those entities may not be waste dischargers. The only restriction is that the burden of preparing the reports bears a reasonable relationship to the need for and the benefits to be obtained from the reports.

10.1.3 Discharger Monitoring

CWC §13267 provides that the Regional Board can require any person who has discharged, discharges, proposes to discharge or is suspected of discharging waste to

[1] See CWC § 13050(j) A "Water Quality Control Plan" or "Basin Plan" consists of a designation or establishment for the waters within a specified area of all of the following: (1) Beneficial uses to be protected, (2) Water quality objectives and (3) A program of implementation needed for achieving water quality objectives.

[2] See CWC § 13242.

[3] See Clean Water Act § 303(e)

investigate, monitor, and report information. The only restriction is that the burden of preparing the reports bear a reasonable relationship to the need for and the benefits to be obtained from the reports.

CWC § 13383 provides that the Regional Board may establish monitoring requirements for any person who discharges pollutants or dredged or fill material or proposes to discharge pollutants to navigable waters of the United States.

10.2 Monitoring Objectives

The specific objectives of this Implementation Monitoring Plan are as follows:

1. Establish a monitoring program for Rainbow Creek and its tributaries using monitoring, sampling and analytical methods consistent with the SWRCB Surface Water Ambient Monitoring Program (SWAMP); SWAMP data quality assurance protocols; and SWAMP data management;

2. Characterize baseline conditions in Rainbow Creek and its tributaries with respect to nutrients to place future monitoring data into perspective and document progress towards cleaner water;

3. Evaluate whether a groundwater monitoring network in the Rainbow Creek watershed is necessary in defining nutrient concentration trends. If a groundwater well network is determined to be necessary, and the burden of preparing the reports bears a reasonable relationship to the need for and the benefits to be obtained from the reports, then monitoring should document whether implementation of MPs /BMPs by dischargers translate to decreased nutrient concentrations in groundwater and reduced nutrient loading to Rainbow Creek from groundwater.

4. Track changes in water quality over time in Rainbow Creek and its tributaries with respect to nutrients and enable comparison of baseline data and TMDL target values with conditions. Determine whether the “trajectory” of the measured water quality values points toward attainment of the nutrient water quality objectives;

5. Evaluate the effectiveness of the TMDL implementation actions over time and determine the need for revisions to improve the implementation action plan;

6. Provide the monitoring data needed to verify or refine assumptions, resolve uncertainties, and improve the scientific foundation of the TMDL; and

7. Provide the monitoring data needed to evaluate the overall TMDL implementation effectiveness and success in attaining nutrient water quality objectives in Rainbow Creek and its tributaries.

10.3 Regional Board Actions

1. **Issue Order to Submit Monitoring Plan to Caltrans and County of San Diego**
   The Regional Board shall, within 90 days of USEPA approval of the Basin Plan Amendment, issue an Order to Caltrans under CWC §13383 and a Order to the County of San Diego under CWC §13225, to prepare and submit an Implementation Monitoring Plan containing the elements described in **Section 10.5 Implementation Monitoring Plan Elements** below. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

2. **Issue Order to Implement Monitoring Plan to Caltrans and County of San Diego**
   Upon concurrence with the County of San Diego's and Caltrans' Implementation Monitoring Plan the Regional Board shall issue an Order to Caltrans under CWC § 13383 and an Order to the County of San Diego under CWC § 13225, to implement monitoring. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

10.4 COUNTY OF SAN DIEGO And CALTRANS ACTIONS

1. **Prepare and Submit Monitoring Plan**
   The County of San Diego and Caltrans shall collaborate to prepare and submit an Implementation Monitoring Plan for the Rainbow Creek watershed containing the elements described in **Section 10.5 Implementation Monitoring Plan Elements** below, upon direction by the Regional Board in a CWC §13225 / CWC §13383 Order. The Implementation Monitoring Plan shall be modified as requested by the Regional Board.

2. **Implement Monitoring Plan**
   The County of San Diego and Caltrans shall implement the Implementation Monitoring Plan upon direction by the Regional Board pursuant to a CWC §13225 / §13383 Order. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

10.5 Implementation Monitoring Plan Elements

The Implementation Monitoring Plan shall contain the following elements:

1. **Surface Water Monitoring Stations**
   Monitoring stations shall be proposed that best serve the monitoring objectives described above in Section 10.2 Monitoring Objectives. Previously monitored locations that shall be considered include Jubilee, Hines Nursery, Oak Crest, Rainbow Glen Tributary, Margarita Glen Tributary, Willow Glen-4, Willow Glen Tributary,

Riverhouse, Via Milpas Tributary, and Stage Coach (See Figure A-3, in Appendix A). An additional sampling location between Oak Crest and Willow Glen-4 should also be considered. For instance, a monitoring location might be placed downstream of Oak Crest Mobile Estates to assess nutrient loading from this property. Monitoring stations shall also be considered at strategic nodes in Rainbow Creek and its tributaries that would monitor nutrient discharges from individual sources of a common land use category.

2. **Groundwater Monitoring Stations**
The location of existing wells and the proposed location of additional monitoring wells if necessary to measure the effectiveness of the TMDL point and nonpoint source control measures and the progress the waterbody is making toward attaining water quality objectives. Methods for purging and sampling monitoring wells to provide representative samples for the waste constituents of interest should be described.

3. **Surface Water Monitoring Frequency**.
Monitoring frequencies of the various monitoring parameters shall be proposed that best serve the monitoring objectives described above in Section 10.2 Monitoring Objectives. The frequencies should be adequate to evaluate ambient conditions and address any impact from low dissolved oxygen concentrations and algal growth.

4. **Groundwater Monitoring Frequency**
If a groundwater well network is determined to be necessary and the burden of preparing the reports has been demonstrated to bear a reasonable relationship to the need for and the benefits to be obtained from the reports, monitoring should be conducted at a frequency that best serves the objectives described above Section 10.2 Monitoring Objectives. . The sampling frequencies should be adequate to define the nitrate variability at each well. These results will serve as a basis for determining the long-term sampling frequency for the network.

5. **Surface Water Quality Parameters**
Surface Water Quality Parameters shall include nitrogen (including nitrate, nitrite, ammonia and total Kjeldahl nitrogen (TKN)), phosphorus (including orthophosphate and total), dissolved oxygen, pH, turbidity, and temperature or a recommended subset or alternate set of parameters with a justification.

6. **Groundwater Quality Parameters**
If a groundwater well network is determined to be necessary and the burden of preparing the reports bear a reasonable relationship to the need for and the benefits to be obtained from the reports, then Groundwater Quality Parameters should include total nitrogen, nitrate, ammonia, nitrites, TKN, orthophosphate, total phosphorus, pH, dissolved Oxygen and TDS or a recommended subset or alternate set of parameters with a justification

7. **Hydrology**
Flow rate measurements shall be taken to calculate nutrient loading, to provide additional information about the hydrology of the watershed, and to identify patterns in algal growth.

8. **Algal Biomass**
Characterization of algal species composition is needed to provide a more reliable indicator of trophic status and evidence of nutrient condition (USEPA 2000a). The growth of algae is stimulated principally by nutrients such as nitrogen and phosphorus, but also requires adequate water temperature, light, flow, and dissolved oxygen. It is assumed at this time that both factors are co-limiting. Characterization of algal species composition may give a better understanding of the relationships between all the factors that affect algal growth, including sunlight, nitrogen, phosphorus, temperature, and dissolved oxygen. Algal biomass should be quantified by mass and/or by % cover of bottom (USEPA 2000a). Collection and measurement of algal biomass should be performed uniformly or by a standardized method (see USEPA 2000a).

9. **Biological Assessment Monitoring**
It is recommended that biological assessment monitoring of benthic microinvertebrates be performed at a minimum of three stations on Rainbow Creek and a reference stream. Biological assessment monitoring should be performed in accordance with the California Stream Bioassessment Methods Manual (Harrington and Born 2000). Changes in the stream's biological integrity (e.g., an increase or decrease in diversity and abundance of sensitive species) could be used as an indicator of changes in the health of the creek. Sampling done in 1998-99 for the San Diego Ambient Bioassessment Program (CDFG 2000a) indicates that benthic macroinvertebrate communities vary seasonally. The seasonal trend could be due in part to rainfall and consequent streamflow conditions (e.g., scouring). Thus, sites should be sampled for benthic macroinvertebrates at least twice each year: once during the spring (i.e., May), and again in the fall (preferably in October).

10. **Monitoring Reports**
Monitoring reports shall be submitted in both electronic and paper formats and include the following information:

    a. An executive summary addressing all sections of the monitoring report, comprehensive interpretations and conclusions, and recommendations for future actions.
    b. A description of monitoring station locations by latitude and longitude coordinates, frequency of sampling, quality assurance/quality control procedures and sampling and analysis protocols.
    c. The data/results, methods of evaluating the data, graphical summaries of the data, and an explanation/discussion of the data.

d. An assessment of the compliance of runoff characteristics with the required load reductions from each of the land use categories assigned a load reduction.
e. Identification and analysis of trends in surface and groundwater quality and assessment of compliance with nutrient water quality objectives.
f. An evaluation of the effectiveness of the TMDL implementation actions and the need for revisions to improve the implementation action plan;

Table 10-1. Recommended Monitoring Parameters

Parameter	Type of sample[1]
Surface Water Monitoring	
Total nitrogen, nitrate, ammonia[2], nitrites, TKN, orthophosphate, and total phosphorus concentrations	Grab
Temperature	In Situ
pH	In Situ
Dissolved Oxygen	In Situ
Turbidity	In Situ
TDS	Grab
Flow rate	Field Measurement
Algal biomass (% cover of bottom and/or Chl a/ash free dry weight (AFDM))	In Situ and/or Grab
Benthic macroinvertebrate community analysis (recommended)	Grab
Groundwater Monitoring	
Total nitrogen, nitrate, ammonia[2], nitrites, TKN, orthophosphate, and total phosphorus concentrations	Grab
pH	Grab or In Situ
Dissolved Oxygen	Grab or In Situ
TDS	Grab or In Situ

[1] A California certified laboratory should be used with an approved QA/QC plan.

[2] All laboratory detection limits should be sufficient to determine compliance with the water quality objective. For example, un-ionized ammonia in surface waters (25 μg/L).

11. **Quality Assurance / Quality Control Plan**

The monitoring program shall develop and implement a QA/QC plan for field and laboratory operations to ensure that data collected are of adequate quality given the monitoring objectives[4]. The QA/QC plan for field operations shall cover the following, at a minimum:

a. Quality assurance objectives;
b. Sample container preparation, labeling and storage;
c. Chain-of-custody tracking;
d. Field setup;
e. Sampler equipment check and setup;
f. Sample collection;
g. Use of field blanks to assess field contamination;
h. Use of field duplicate samples;
a. Transportation to the laboratory;
b. Training of field personnel; and
c. Evaluation, and enhancement if needed of the QA/QC plan.

The QA/QC plan for laboratory operations shall cover the following, at a minimum:

Quality assurance objectives;
Organization of laboratory personnel, their education, experience, and duties;
Sample procedures;
Sample custody;
Calibration procedures and frequency;
Analytical procedures;
Data reduction, validation, and reporting;
Internal quality control procedures;
Performance and system audits;
Preventive maintenance;
Assessment of accuracy and precision;
Correction actions; and
Quality assurance report.

12. **<u>Reporting Period</u>**

Annual reports should cover the period of October 1 through September 30. The reports should be submitted to the Regional Board by January 31 of the following year and should be incorporated within the annual receiving water monitoring reports

[4] For more information on QA/QC activities, including guidelines and example QA/QC documents, refer to http://www.swrcb.ca.gov/swamp/qapp.html

required under the County of San Diego's MS4 NPDES Permit Receiving Waters Monitoring and Reporting Program.[5]

13. **Reporting Frequency**

The first report shall be due in the first January following initiation of the monitoring program. Reporting shall continue on an annual basis until the nutrient water quality objective has been attained and maintained in Rainbow Creek.

[5] The term "MS4 NPDES Storm Water Permit" currently refers to Order No.2001-001, NPDES No. CAS0108758, Waste Discharge Requirements For Discharges Of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities Of San Diego County, and the San Diego Unified Port District. Attachment B to this Order contains the Receiving Waters Monitoring and Reporting Program for Order No. 2001-01. The annual receiving water monitoring report is described in Table 6, Item 28, page 51 of Order No. 2001-01.