

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

INVESTIGATIVE ORDER NO. R9-2019-0007

**AN ORDER DIRECTING
THE CITIES OF MURRIETA, TEMECULA, AND WILDOMAR,
THE COUNTIES OF SAN DIEGO AND RIVERSIDE,
THE RIVERSIDE FLOOD CONTROL AND WATER CONSERVATION DISTRICT,
AND THE UNITED STATES MARINE CORPS BASE CAMP PENDLETON
TO DESIGN AND IMPLEMENT
A WATER QUALITY IMPROVEMENT MONITORING AND ASSESSMENT PROGRAM
FOR EUTROPHIC CONDITIONS IN THE SANTA MARGARITA RIVER ESTUARY
AND WATERSHED, CALIFORNIA**

WHEREAS, The California Regional Water Quality Control Board, San Diego Region (San Diego Water Board), finds that:

1. **Purpose of Order:** The purpose of this Investigative Order (Order) is to assess the condition of the Santa Margarita River Estuary (Estuary) and to evaluate the linkage between the nutrient loading trends resulting from implementation actions by the Cities of Murrieta, Temecula, and Wildomar, the Counties of San Diego and Riverside, the Riverside Flood Control and Water Conservation District, and the United States Marine Corps Base Camp Pendleton (collectively referred to hereafter as Dischargers) and the restoration of the water quality and beneficial uses in the Estuary.
2. **Basis for Requiring Reports:** California Water Code (Water Code) section 13267 provides that the San Diego Water Board may require dischargers, past dischargers, or suspected dischargers furnish technical or monitoring reports as the San Diego Water Board may specify, provided that the burden, including costs, of these reports shall bear a reasonable relationship to the need for the reports. When requiring a report under Water Code section 13267, the San Diego Water Board is required to provide a written explanation of the need for the reports and to identify evidence that supports requiring a person to provide those reports. The Findings in this Order, and its attachments, provide the explanation and evidence supporting the requirements of this Order.

3. **Estimated Implementation Costs of the Order:** The estimated costs associated with the implementation of the directives included in this Order are provided in Table 1:¹

Table 1
Estimated Costs to Develop and Conduct Estuary and Watershed Monitoring, Assessment, and Reporting.

Task	Estimated Yearly Monitoring and Reporting Costs	Estimated Cost for Four Years of Monitoring and Reporting
Prepare Workplan and QAPP	One Time Cost	\$32,332
Field Work	\$231,890	\$927,561
Laboratory Analysis, Materials, Supplies	\$156,062	\$624,248
Report Preparation	\$70,000	\$280,000
Estimated Total	\$457,952	\$1,864,141

4. **Santa Margarita River Estuary:** The Estuary is located along the southern California coast in northern San Diego County on the southwestern edge of the United States Marine Corps Base Camp Pendleton (Camp Pendleton). The Estuary is one of the few remaining and largely unmodified coastal estuaries in southern California, providing 192 acres of valuable estuarine habitat including mudflats, salt pannes, salt marsh, and subtidal habitats. This unique estuarine habitat includes beneficial uses of water that provide important refuge, foraging areas, and breeding grounds suitable for several threatened and or endangered species, as well as coastal marine species. These include populations of State and federally endangered or threatened species such as the California Least Tern (*Sternula antillarum browni*), Western Snowy Plover (*Charadrius alexandrinus nivosus*), Tidewater Goby (*Eucyclogobius newberryi*), Belding's Savannah Sparrow (*Passerculus sandwichensis beldingi*), Light-footed Ridgway's Rail (*Rallus obsoletus levipes*), Least Bell's Vireo (*Vireo bellii pusillus*) and Southern California Steelhead (*Oncorhynchus mykiss*).

¹ The San Diego Water Board developed these cost estimates using information provided by Stakeholders as well San Diego Water Board estimates, including. e-mail communications from Matt Yeager of Riverside County Flood Control and Water Conservation District to Hiram Sarabia of the San Diego Water Board between September and October 2018.

- 5. Santa Margarita River Estuary Watershed:** The Estuary's watershed (Watershed) drains into the Pacific Ocean and covers an area of approximately 750 square miles, encompassing portions of both Riverside County and San Diego County. Approximately 73.5 percent of the Watershed land surface falls within Riverside County, which includes all or portions of the Cities of Murrieta, Temecula, and Wildomar. The remaining 26.5 percent of the Watershed is in San Diego County, where Camp Pendleton and the unincorporated communities of Fallbrook and Rainbow are located.

The Estuary and watershed comprise the Santa Margarita Hydrologic Unit (HU 902). This Hydrologic Unit includes nine hydrologic areas: Ysidora (902.1), De Luz (902.2), Murrieta (902.3), Auld (902.4), Pechanga (902.5), Wilson (902.6), Cave Rocks (902.7), Aguanga (902.8), and Oak Grove (902.9). Major surface waterbodies in the Hydrologic Unit include: the Santa Margarita River, Rainbow Creek, De Luz Creek, Sandia Creek, Temecula Creek, Murrieta Creek, Vail Lake, Skinner Reservoir, and the Estuary.

- 6. Basin Plan:** Water quality standards applicable for the Estuary are presented in the Water Quality Control Plan for the San Diego Basin (Basin Plan). The Basin Plan:
- a. Designates beneficial uses for surface waters and groundwaters;
 - b. Sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's antidegradation policy;
 - c. Describes implementation programs to protect the beneficial uses of all waters in the Region; and
 - d. Describes surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan.
- 7. Water Quality Standards - Basin Plan Beneficial Uses:** The Basin Plan designates the following eight existing beneficial uses for the Estuary:
- a. Contact Water Recreation (REC 1)
 - b. Non-Contact Water Recreation (REC 2)
 - c. Estuarine Habitat (EST)
 - d. Wildlife Habitat (WILD)
 - e. Rare, Threatened, or Endangered Species (RARE)
 - f. Marine Habitat (MAR)
 - g. Migration of Aquatic Organisms (MIGR)
 - h. Spawning, Reproduction, and/or Early Development (SPWN)

8. Water Quality Standards – Basin Plan Water Quality Objectives: The Basin Plan contains Water Quality Objectives (WQOs) developed to protect the most sensitive beneficial uses designated for a water body. The WQO for biostimulatory substances applicable to the Estuary includes a narrative WQO and a numeric interpretation.

a. Narrative WQO: *Inland surface waters, bays and estuaries and coastal lagoon waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses.*

b. Numeric Interpretation:

Concentrations of nitrogen and phosphorus, by themselves or in combination with other nutrients, shall be maintained at levels below those which stimulate algae and emergent plant growth.

Threshold total phosphorus (P) concentrations shall not exceed 0.05 milligrams per liter (mg/l) in any stream at the point where it enters any standing body of water, nor 0.025 mg/l in any standing body of water. A desired goal in order to prevent plant nuisance in streams and other flowing waters appears to be 0.1 mg/l total P. These values are not to be exceeded more than 10% of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible, and changes are approved by the San Diego Water Board.

Analogous threshold values have not been set for nitrogen compounds; however, natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld. If data are Jacking, a ratio of N:P = 10:1, on a weight to weight basis shall be used.

9. Clean Water Act Section 303(d) List of Water Quality Limited Segments: The Clean Water Act (CWA) section 303(d) requires each state to identify waters for which effluent- based discharge limitations are not stringent enough to implement any water quality standards, prioritize those waters based on the severity of the pollution and the uses of the waters, and establish Total Maximum Daily Loads (TMDLs) for pollutants at a level necessary to implement the applicable water quality standards. The San Diego Water Board placed the Estuary on the Clean Water Act section 303(d) List of Water Quality Limited Segments (303(d) List) in 1996 due to eutrophic conditions.

Eutrophication is defined as excessive nutrient loading resulting in prolific algal growth and low dissolved oxygen which leads to physiological stress or mortality in aquatic life. Eutrophication produces adverse ecological effects and creates a condition of public nuisance. Eutrophic conditions within the Estuary restrict the ability of its water to support the beneficial uses designated in the Basin Plan. The beneficial uses of the Estuary that are most sensitive to eutrophic conditions are: EST, MIGR, RARE, and SPWN. Eutrophication also adversely affects the REC-1 and REC-2 beneficial uses.

When eutrophic conditions are present, the Estuary does not meet the WQOs for dissolved oxygen and biostimulatory substances found in the Basin Plan. Eutrophic conditions in the Estuary promote algal blooms which result in low dissolved oxygen concentrations in the water column that can cause death to sensitive rare and endangered aquatic species (see section 5 of Appendix A).

10. Water Quality Impairment of Santa Margarita River Estuary: The impairment is caused by excessive amounts of total nitrogen and total phosphorus entering the Estuary during dry-weather conditions in the summer and winter months. Significant sources of total nitrogen and total phosphorus (nutrients) entering the Estuary include: resurfacing groundwater polluted with nutrients, agricultural discharges, and upstream non-storm water discharges from agriculture and MS4s discharging into the Santa Margarita River and its tributaries. These factors combined with dry-weather conditions contribute to excessive algal growth and low dissolved oxygen, leading to adverse eutrophic conditions that exceed the WQO for biostimulatory substances.

The impairment of the Estuary was confirmed during an impairment assessment conducted by the Southern California Coastal Research Project (SCCWRP) between 2008 and 2009, in response to Investigative Order No. R9-2006-0076 (2006 Investigative Order) issued by the San Diego Water Board. According to the findings of the impairment assessment presented in the [Eutrophication and Nutrient Cycling in Santa Margarita River Estuary](#) report, an average macroalgal biomass greater than 700 grams of wet weight per meter squared (g wet weight m²) would indicate eutrophic conditions (McLaughlin *et al.* 2103)² The results from the 2006 Investigative Order found high average macroalgal biomass (1465 to 1714 g wet weight m²) and macroalgal cover of up to 100 percent.

² McLaughlin, K., M. Sutula, J. Cable, and P. Fong. 2013. Eutrophication and Nutrient Cycling in Santa Margarita Estuary, Camp Pendleton, California. Technical Report 635. Southern California Coastal Water Research Project. Costa Mesa, CA.

Since the impairment assessment was completed, to more accurately measure macroalgal biomass, the protocol was changed to measure dry weight rather than wet weight. Data collected by the U.S. Navy's Space and Naval Warfare Systems Command (SPAWAR) in the Estuary between 2014 and 2016 continue to show evidence of eutrophic conditions manifested as excessive macroalgal blooms. SPAWAR's data show average macroalgal biomass values as high as 416 g dry weight/ m², almost six times above the 70 g dry weight/ m² numeric target (Table 2).

Monitoring by SPAWAR on behalf of United States Marine Corps Base Camp Pendleton has shown that the ongoing discharge of nutrients into the Estuary through resurfacing polluted groundwater from former agricultural fields on Camp Pendleton continues to take place. However, according to SPAWAR data show that attenuation by as much as one to two orders of magnitude has taken place since the discharge was first monitored.

11. Purpose and Definition of Total Maximum Daily Load: A Total Maximum Daily Load (TMDL) is a calculation of the loading capacity of a specific pollutant that can be assimilated by the Estuary without impairing its designated beneficial uses. A TMDL can then be used as a planning tool for restoring water quality conditions of a water body by estimating uncontrollable load allocations and assigning waste load allocations to controllable sources in order to achieve the calculated assimilative capacity.

The calculations can also be used to support an alternative restoration approach to a formal TMDL if there are regulatory mechanisms such as National Pollutant Discharge Elimination System (NPDES) permits and/or Waste Discharge Requirements (WDRs) with existing discharge limitations that can achieve the load reductions necessary to meet the calculated assimilative capacity.

12. Estuary TMDL Project and Calculations: The San Diego Water Board in collaboration with the Santa Margarita River Estuary Watershed Nutrient Initiative Stakeholder Group (Stakeholder Group)³ developed a project to calculate proposed TMDLs for the Estuary, identify the numeric targets, and the reduction in pollutant loadings necessary to restore beneficial uses of the Estuary. These calculations are presented in The Santa Margarita River Estuary, California Nutrients Total Maximum Daily Load Project Draft Staff Report (Draft Staff Report) in Appendix A. The proposed TMDLs have not been adopted by the San Diego Water Board but can be used to support a Basin Plan Amendment as necessary.

TMDL calculations presented in the Draft Staff Report show that the Estuary can assimilate 13,246 pounds of delivered total nitrogen and 1,528 pounds of delivered total phosphorus per year during the dry weather impairment period and still meet the numeric targets necessary to achieve compliance with WQOs. This represents a 76 percent nutrient load reduction to the Estuary relative to water year 2008 (see Appendix A for details).

13. Santa Margarita River Estuary Seasonal Variability: Critical conditions for the Estuary include both the summer-dry (May through September) and winter-dry (October through April) weather conditions. While the most severe eutrophic conditions in the Estuary are likely to be encountered during the peak summer dry-weather, when the weather is warmer, days are longer, and the exchange with the Ocean is blocked by the buildup of a sand berm, excessive macroalgal growth has also been documented during winter-dry weather.

14. Numeric Targets: Numeric targets are specific goals for TMDLs that ensure the protection of designated beneficial uses of waters and provide a basis for data analysis and allocations. The Draft Staff Report identifies the macroalgal biomass, dissolved oxygen, and benthic community condition numeric targets that can be used to measure the restoration of beneficial uses in the Estuary (Table 2).

³ Stakeholder group members and technical advisors in the Estuary project included: California State University Sacramento, Center for Collaborative Policy; Caltrans; CalTrout; County of San Diego; Rancho California Water District; Riverside County Flood Control and Water Conservation District; Larry Walker and Associates; NAVY SPAWAR Systems Center Pacific; Pechanga Band of Luiseno Indians; Sierra Club; San Diego County Farm Bureau; Southern California Coastal Water Research Project; Stetson Engineers; U.S. EPA; and United States Marine Corps Base Camp Pendleton.

Table 2
Santa Margarita River Estuary Numeric Targets in the Draft Staff Report

Metric	Primary Numeric Target	Secondary Numeric Target	Applicable Season
Surface Water Macroalgal Biomass	≤57 grams dry weight/ m ²	≤70 grams dry weight/ m ²	Winter Dry and Summer Dry
Water Column Dissolved Oxygen	Daily minima 5.0 mg/L	7-day average of daily minimum measurements ≥5.0 mg/L 10 percent allowable exceedance	Winter Dry and Summer Dry
Benthic Community Condition Score	---	≤2.0 (Low Disturbance based on Sediment Quality Objectives (SQQ) scale)	Winter Dry and Summer Dry

15. Nutrient Numeric Endpoints: To develop these numeric targets, the San Diego Water Board in collaboration with the Stakeholder Group used the nutrient numeric endpoint (NNE) framework approach for California estuaries developed by SCCWRP for the State Water Resources Control Board (State Water Board).

This Order relies on using the NNE approach to assess the condition of the Estuary and determine protection of the most sensitive beneficial uses (EST, MIGR, RARE, and SPWN). Although the NNE-based numeric targets have not been adopted in a formal TMDL or as a water quality objective, the NNE approach provides a scientifically- defensible methodology for interpreting the narrative biostimulatory WQO and for controlling nutrient loads to levels such that the risk of impairing the designated beneficial uses is minimized.

The NNE framework is founded on the premise that site-specific ecological response variables, such as dissolved oxygen concentrations, macroalgal biomass, and benthic community condition score combined with a weight of evidence approach provide a more direct and robust means of assessing beneficial use impairment than relying on nutrient concentrations alone. Because fixed nutrient concentrations may or may not result in protection from eutrophication for a particular water body, using the NNE approach is more protective of beneficial uses. Hence, numeric targets represent the values for ecological response indicators at which beneficial uses are expected to be protected.

16. Estuary Water Quality Restoration Approach: According to the analysis presented in the Draft Staff Report (see Appendix A), the enforcement and full implementation of the prohibitions and requirements in the following permits, combined with natural attenuation of polluted groundwater, is expected to achieve the load reductions necessary to restore the beneficial uses of the Estuary:

- General Waste Discharge Requirements for Discharges from Commercial Agricultural Operations for Dischargers that are Members of a Third-Party Group in the San Diego Region (Order No. R9-2016-0004) and General Waste Discharge Requirements for Discharges from Commercial Agricultural Operations for Dischargers Not Participating in a Third-Party Group in the San Diego Region (Order No. R9-2016-0005) (collectively Regionwide Agricultural WDRs);
- Permit for Discharges from the Separate Storm Sewer Systems (MS4s) Draining the Watersheds Within the San Diego Region (San Diego Water Board Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001, and R9-2015-0100) (Regional Phase I MS4 Permit); and
- Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) (2013-0001-DWQ, as amended by 2015-0133-EXEC, 2016-069-EXEC, 2017-XXXX-DWQ, 2018-0001-EXEC, 2018-007-EXEC) (Statewide Phase II MS4 Permit).

As discussed in the Draft Staff Report, this approach is sensible because after the 2006 investigative order that found widespread eutrophication, two major sources of nutrients to the Estuary have ceased (treated sewage from Camp Pendleton and groundwater dewatering from the North County Transit District) and the San Diego Water Board has issued stronger discharge requirements to MS4s and agricultural operations.

17. Persons Responsible for the Discharges: Loading of total nitrogen and total phosphorus into the Estuary from Phase I and Phase II MS4 dischargers (collectively MS4 dischargers) and Commercial Agricultural Dischargers represent the largest controllable sources of nutrients.

The owners and operators of MS4s in the Watershed are responsible for discharges of total nitrogen and total phosphorus from land uses and locations within their jurisdictions through their MS4s to tributaries of the Santa Margarita River, Santa Margarita River, and Estuary. MS4 dischargers are regulated by the Regional Phase I MS4 Permit and the Statewide Phase II MS4 Permit. The owners and operators of MS4s subject to this Investigative Order include the following entities:

- County of Riverside
- City of Murrieta
- City of Temecula
- City of Wildomar
- County of Riverside Flood Control and Water Conservation District
- County of San Diego
- United States Marine Corps Base Camp Pendleton

Dischargers named in this Order:

- Own and or operate MS4s that are sources of nutrients to the Estuary throughout the year;
- Own and or operate MS4s that include the receiving waters within their jurisdiction;
- Have jurisdiction over the areas where monitoring stations are to be located;
- Have land use authority over agricultural operations within their jurisdiction; and
- May convey agricultural discharges to the Estuary via their MS4s.

Caltrans and the City of Menifee are not subject to this Order because their individual land footprint in the Watershed is very small (less than one percent of the total Watershed area). The City of Menifee MS4 is regulated through a NPDES Permit issued by the Santa Ana Regional Water Quality Control Board (RBS-2 010-0033). In addition, Caltrans has affirmed that it does not use fertilizers, and monitoring has shown that Caltrans has very little nutrient discharge from monitored sites.⁴ Caltrans is regulated by the requirements of State Water Board Order No. 2012-0011-DWQ (As amended by Orders Nos. 2014-0006- EXEC, 2014-0077-DWQ, and 2015-0036-EXEC).

⁴ Caltrans. District 11. Rainbow Creek Nutrient TMDL Implementation Monitoring. Historical Research, Data Analysis, and Conclusions. February 2017.

Agricultural Discharges: At this time, owners and operators of Commercial Agricultural Operations in the Santa Margarita River Watershed are not subject to this Order. The San Diego Water Board recognizes that more work is needed to reach full enrollment and implementation of the Regionwide WDRs in the Watershed. In 2019, the San Diego Water Board will dedicate increased staff resources to improve enrollment in and compliance with the requirements of the Regionwide Commercial Agricultural WDRs in the Watershed. Commercial Agricultural Operations may be identified and required to perform additional monitoring under a subsequent CWC section 13267 Investigative Order during the term of review of the NNE approach, particularly if waste load reductions are insufficient to achieve the NNE targets.

The Regionwide Commercial Agricultural WDRs include strict discharge prohibitions, discharge specifications, receiving water limitations, and management practice requirements for agricultural operations. These provisions are expected to result in the reduction and/or elimination of total nitrogen and total phosphorus loading to surface water and groundwater from agricultural sources to the Santa Margarita River and Estuary. In addition to basic enrollment responsibilities, the San Diego Water Board will conduct inspections and enforcement at individual Commercial Agricultural Operations as necessary to address waste load reductions from Commercial Agricultural Operations necessary to achieve the NNE targets in the Santa Margarita River Estuary.

Regionwide Commercial Agricultural WDRs require enrolled Commercial Agricultural Operations to implement monitoring of ambient Santa Margarita River water quality and ecosystem health in drainages influenced by agricultural land use ensuring that illicit agricultural discharges are detected. Third-party monitoring plans for Commercial Agricultural Operations in the Santa Margarita Watershed, including monitoring sites in Sandia Creek and Devils Creek, have been approved by the San Diego Water Board. The San Diego Water Board will review information collected by the third party monitoring groups to identify problematic waste loads in the aforementioned key drainages, other drainages as may be identified, and ensure that the information is compatible for analytical purposes with the data collected by Parties regulated by this Order. The San Diego Water Board will incorporate this and other data to complete the analysis of nutrient source reduction and attainment of the NNEs in the estuary.

18. Rainbow Creek TMDL: The San Diego Water Board Adopted the Rainbow Creek TMDLs for Total Nitrogen and Total Phosphorus (Rainbow Creek TMDL) to address water quality impairments in Rainbow Creek. The Rainbow Creek TMDL is being implemented through the Regionwide Agricultural WDRs and the Regional Phase I MS4 permit. Monitoring is being conducted in Rainbow Creek by the County of San Diego as required by the Regional Phase I MS4 permit to determine its MS4 nutrient loading into Rainbow Creek.

19. Assessment of Progress Towards Estuary Restoration: The San Diego Water Board will consider periodically whether additional parties (e.g. individual Commercial Agricultural Operations or Third Party Groups) should be named or if existing parties should be removed from this Order. Monitoring in the Estuary and river is required for four consecutive years. Monitoring will be based on the water year and is scheduled to begin in as soon as possible and end after October 2023. A four-year assessment report will comprise the annual report for 2024 for all data collected through October 2023. In 2024, considering all available data from multiple sources, the San Diego Water Board will evaluate whether continuation of monitoring or other actions, including but not limited to revision to the proposed NNEs in the Draft Staff Report, adoption of a TMDL to address Eutrophication in the Estuary, or revision of the applicable water quality objectives as necessary or appropriate.

20. Need for and Benefit of Technical and Monitoring Reports: Eutrophic conditions within the Estuary affect the ability of the Estuary's waters to provide essential habitat for a number of rare and endangered species of fish and birds. Controllable MS4 discharges represent the largest point source of total nitrogen and total phosphorus to the Estuary, making up 12 and 24.7 percent of the total yearly nutrient loads in the Watershed, respectively (Appendix A, Figure 14). Additionally, an estimated 2,511 pounds of total nitrogen and 248 pounds of total phosphorus from agricultural discharges originate within or enter an MS4. (Id. Table 11.) Surface water monitoring of the Estuary and the main stem of the Santa Margarita River is necessary to:

- a. Evaluate whether Dischargers' implementation actions are improving Estuary conditions using NNE indicators, and
- b. Verify assumptions of linkage between the Dischargers' nutrient loading in the River (including the fate and transport) and the conditions of the Estuary.

This Order requires the Dischargers to submit technical and monitoring reports based on the NNE framework because NNE-based numeric targets, developed through a Stakeholder Group effort, are the most reliable indicators of Estuary ecological health and beneficial use attainment. The requirements in this Order are based on the best available science about current conditions in the Estuary. These requirements were developed in collaboration with the Dischargers through the Stakeholder Group with the understanding that issuance of an Investigative Order was preferred to the adoption of a rigorous TMDL that would impose absolute waste load reductions and enforceable targets for compliance. As discussed in Finding 3, the San Diego Water Board estimates the cost of complying with the requirements in this Order is approximately \$457,952 per year, for a total of \$1,864,141 over the course of 4 years. Although not calculated, it is likely the costs of mandatory waste load reductions through BMP implementation and compliance with TMDL milestones and targets would be far greater than the sum of the monitoring proposed in this Order. The scope of the monitoring is necessary to evaluate whether the Dischargers' implementation actions are making the necessary progress to reduce eutrophic conditions in the Estuary.

An overabundance of macroalgae depletes dissolved oxygen in the Estuary and negatively impacts habitat for rare and endangered species. A reduced scope of monitoring, reporting, and investigation will not adequately protect water quality because it will not allow the San Diego Water Board to reliably determine the condition of the Estuary, identify the factors preventing attainment of NNE-based numeric targets, adequately evaluate the linkage between the condition of the Estuary and the River, or confirm modeling assumptions.

The Phase 1 MS4s identified eutrophication as the highest priority water quality condition within the WQIP in part because of the ability to reduce eutrophication in the Estuary by focusing on improving the water quality of dry-weather MS4 discharges.⁵ However, the proposed monitoring in the WQIP does not include any Estuary locations to assess its conditions or the effectiveness of the WQIP actions on the Estuary. The requirements of this Order will help inform the success of the WQIP.

⁵ Santa Margarita River Watershed Management Area Water Quality Improvement Plan (Oct 2018) at https://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/docs/wqip/santa_margarita_river/SMR-WQIP-October-2018_NO_REDLINEs.pdf (see Executive Summary and Section 4)

Based on the relationship of the MS4 discharges to the impairments in the Estuary, the burden of providing the required reports, including the costs, bears a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.

21. California Environmental Quality Act (CEQA) Requirements: This Order is an action to assure the restoration of beneficial uses in the Santa Margarita River Estuary by enforcing the laws, regulations, and standards administered by the San Diego Water Board. As such, this action is categorically exempt from the provisions of CEQA pursuant to sections 15306 and 15308 of the Public Resources Code.

An exemption is justified because no standards will be relaxed to allow environmental degradation and there is no reasonable possibility that the investigative projects or activities will have a significant negative effect on the environment. This action is also exempt from CEQA provisions in accordance with section 15061(b)(3) of Chapter 3, Title 14 of the California Code of Regulations because it can be seen with certainty that there is no possibility that the activity in question may have a significant negative effect on the environment. CEQA will be complied with as necessary when and if remedial actions are proposed.

22. Stakeholder and Public Participation: Interested persons and the public have had reasonable opportunity to participate in development and review of the proposed water quality restoration approach and to review this Order. Efforts to solicit public review and comment included:

- a. A multi-year Estuary Nutrients Project development process with meetings with stakeholders and the public in which municipalities regulated by the San Diego Regional MS4 Permit were actively and engaged as a means to ensure efficacy and effectiveness of existing and proposed MS4 BMPs.
- b. Agricultural stakeholders were notified of meetings and the progress of the project electronically through the Stakeholder Group e-mail listserv and through participating Farm Bureaus (as representatives of agricultural dischargers).
- c. Distribution of the Tentative Order and Draft Staff Report to the Stakeholder Group members and the public on October 9, 2018.
- d. A public informational meeting was held on October 24, 2018, where stakeholders and the public were provided the opportunity to comment.

Notices for all meetings were sent by the Stakeholder Group to known interested persons and the municipalities with jurisdiction in the Santa Margarita River Estuary's watershed. All the written comments submitted to the San Diego Water Board during the review and comment periods were considered.

23. Peer Review: Health and Safety Code section 57004, requires all Cal/EPA organizations to submit for external scientific review the scientific basis and scientific portion of all proposed policies, plans and regulations. The peer reviewer's responsibility is to determine whether the scientific findings, conclusions, and assumptions are based upon sound scientific knowledge, methods, and practices. Though not required for this Order, the Draft Staff Report was subjected to a peer review to ensure the reliability of the Report's findings. The San Diego Water Board's responses to peer reviewers' comments are available online at: https://www.waterboards.ca.gov/water_issues/programs/peer_review/rb9_santa_margarita_riv_estuary/

24. Public Notice: The San Diego Water Board has notified all known interested persons and the public of its intent to consider adoption of this Order.

Since 2011, the San Diego Water Board has meet with the Stakeholder Group, including the Dischargers named in the Order. In 2017, the Stakeholder Group recommended and agreed to having an investigative order issued to address the monitoring and assessment needs of the Estuary restoration project.

Development of the Order began in July of 2018 and the Stakeholder Group was kept informed of the progress. On October 9, 2018, a tentative Order was released to the public for a 30-day comment period. During the public comment period, on October 24, 2018, the San Diego Waterboard held a public workshop in the City of Temecula to present the tentative Order.

Following the public workshop, on November 6, 2018, a 2-hour phone conference was held with the Stakeholder Group to further discuss the tentative Order. After the Stakeholder Group phone conference, in response to a request by Riverside County copermittees, the public comment period was extended by an additional seven days to November 15, 2018. On the morning of November 15, 2018, a second 2-hour phone conference with the Stakeholder Group was scheduled to continue the previous discussion and allow more opportunities to comment.

25. Compliance with Existing Permits: Issuance of this Order does not relieve any party from complying with any existing permit nor lessen any permit requirements, including but not limited to requirements to find and eliminate prohibited discharges.

26. Qualified Professionals: Qualified professionals are necessary for conducting the work and for preparing the technical report(s) required by this Order to ensure that information presented to the San Diego Water Board is reliable and accurate. Professionals must be qualified, licensed where applicable, and competent and proficient in fields pertaining to the required activities. California Business and Professions Code sections 6735, 7835, and 7835.1 require that engineering and geologic evaluations and judgments be performed by or under direction of licensed professionals.

IT IS HEREBY ORDERED, pursuant to Water Code section 13267, that the Cities of Murrieta, Temecula, and Wildomar, the Counties of Riverside and San Diego, the Riverside County Flood Control and Water Conservation District, and the United States Marine Corps Base Camp Pendleton (collectively Dischargers) must comply with the following directives:

1. **MONITORING AND ASSESSMENT PROGRAM PLAN:** The Dischargers must prepare and submit to the San Diego Water Board an Estuary and Watershed Monitoring and Assessment Program Workplan (Monitoring and Assessment Workplan) **no later than 6 months after the date this Order is issued**. At a minimum, the Monitoring and Assessment Workplan must include the following:
 - a. **Monitoring and Assessment Workplan Questions:** The Monitoring and Assessment Workplan must describe a scope of work that can adequately and reliably answer the following monitoring questions:
 - i. Is watershed mass loading of total nitrogen and total phosphorus to the River and Estuary reduced to levels that do not exceed the calculated assimilative capacity of the Estuary? Based on available information, do monitoring results confirm the assumption that the implementation and compliance with the Dischargers' existing NPDES permits sufficient to bring about the necessary nutrient load reductions to restore the Estuary in accordance with the schedule provided in the Draft Staff Report (see Appendix A).
 - ii. Are the Estuary numeric targets, as described in Finding 14 and in the Draft Staff Report, for macroalgal biomass, dissolved oxygen, and Benthic Community Condition being achieved and sustained? If not, based on available information, what are the primary stressors causing unsatisfactory eutrophication conditions?
 - b. **Monitoring and Assessment of Estuary:** Estuary monitoring requirements are summarized in Appendix C. The Monitoring and Assessment Workplan must include:
 - i. Monitoring of resurfacing groundwater discharge rates and groundwater total nitrogen and total phosphorus mass loading into the Estuary, to confirm that resurfacing groundwater is no longer a significant source of nutrient loading to the Estuary. Camp Pendleton must monitor resurfacing groundwater nutrient loading into the Estuary from the former Stuart Mesa Agricultural Fields. Data from existing monitoring and modeling efforts may be used to estimate resurfacing groundwater nutrient loading into the Estuary from the Santa Margarita Valley Groundwater Basin.

- ii. Monitoring of Estuary ambient water quality conditions and trends towards meeting numeric targets (Table 2) within the three segments of the Estuary (Appendix B - Figure 2).
 - a. Monitoring of flow and total nitrogen and total phosphorus mass loading into the Estuary from upstream sources.
 - b. Monitoring of Estuary ambient water quality conditions, including April through October and winter period (including 3 monitoring periods) continuous measurement of dissolved oxygen concentrations and saturation, water temperature, pH, salinity/conductivity, water depth, turbidity, and degree of tidal muting or influence. Continuous dissolved oxygen concentration and saturation monitoring (at 15-minute intervals) must occur at two sites (adjacent to 1-5 bridge and Stuart Mesa bridge) and at depths adequate to determine attainment of EST, MIGR, RARE and SPWN beneficial uses.
 - c. Monthly (April through October and during winter period including at least 3 monitoring events) monitoring in the Estuary of surface water chlorophyll a, and total and dissolved inorganic nitrogen and phosphorus concentrations.
 - d. Monthly (April to October) monitoring of macroalgal biomass in the Estuary in accordance with the guidelines in the Standard Operating Procedure (SOP) for Macroalgal Collection in Estuarine Environments (SCCWRP Technical Report #872). Measurements must be made in the intertidal and or subtidal within the three regions of the Estuary:
 - 1) Below the Interstate 5 bridge;
 - 2) Above the Stuart Mesa bridge to the head of the Estuary or the lower reach of the Santa Margarita River; The inner limit or upstream boundary of the Estuary should be defined by changes from estuarine to riparian vegetation, changes in salinity going from brackish to freshwater, and changes in river currents dominating over tidal action.
 - 3) Between the two bridges (Appendix B- Figure 2).
 - e. Monitoring of Estuary to determine Benthic Community Condition:

- 1) Benthic Community Condition sampling must take place at depths that align with the macroalgal sampling (so that relationships between the Benthic Community Condition Score and other parameters may be biologically inferred).
- 2) Monitoring must take place at three randomly selected sites for each of three regions in the Estuary.
- 3) Sampling must take place at least once per year in late summer.
- 4) Sediment total organic carbon, sediment total nitrogen, sediment total phosphorus, and sediment grain size samples must be collected at each site.

c. Monitoring and Assessment of Santa Margarita River

The Monitoring and Assessment Workplan must include monthly (May to October) and bi-monthly (November to March) monitoring of the Santa Margarita River to determine flow and ambient water quality conditions relevant to eutrophication in the Estuary. Parameters to be measured must include: water flow, temperature, conductivity, and ambient total and dissolved inorganic nitrogen and phosphorus.

- i. Monitoring must be temporally representative of flows (capturing monthly, daily, and hourly temporal variability in flow) to demonstrate if total nitrogen and total phosphorus loads are being sufficiently reduced to meet Estuary numeric targets.
- ii. Monitoring locations on the main stem of the Santa Margarita River must include at least one monitoring site for Camp Pendleton, San Diego County, and Riverside County (Sample locations are shown for illustration purposes in Appendix B - Figure 1). The monitoring site must be positioned at the most reasonably accessible downstream point along the Santa Margarita River within Riverside County, San Diego County, and Camp Pendleton (above the Estuary), such that the downstream site is representative of upstream sources of nutrients in the Discharger's jurisdiction. Dischargers may consider including other upstream sites located along the River or tributary, such that the upstream site(s) allows the Dischargers to identify specific drainages or tributaries contributing to exceedances of the biostimulatory and dissolved oxygen WQOs in the Estuary.

- iii. Dischargers must determine dry-weather nutrient loading into the Santa Margarita River and Estuary from Camp Pendleton, San Diego County, and Riverside County.

Santa Margarita River monitoring requirements are summarized in Appendix C.

d. Estuary and Watershed Monitoring and Assessment Workplan

Submissions: The Estuary Monitoring and Assessment Workplan, at a minimum, must include the following:

- i. Maps showing proposed monitoring locations and associated GIS data.
- ii. List of monitoring parameters.
- iii. Frequency of monitoring events.
- iv. Methods to be used to collect and analyze monitoring data.
- v. A Quality Assurance Project Plan (QAPP) describing the project objectives and organization, functional activities, and quality assurance and quality control protocols for the monitoring. The monitoring, sampling and analytical methods must be consistent with the [State Water Board Surface Water Ambient Monitoring Program \(SWAMP\) QAPP and data management protocols](#).⁶
- vi. An assessment of trends with projections for when the numeric targets would be achieved, or an explanation indicating why data is insufficient to do so.

2. IMPLEMENTATION OF THE MONITORING AND ASSESSMENT PROGRAM

PLAN. The Dischargers must begin implementation of the Monitoring and Assessment Workplan no later than 60 days after receiving written notification from the Executive Officer that the Plan satisfies the conditions of this Order.

3. MONITORING AND ASSESSMENT PROGRAM REPORTS. The Dischargers must submit annual Monitoring and Assessment Program Reports (Monitoring Reports) by January 31 of 2021 through 2023 and provide a final report assessing four water years of data (as soon as possible through October 2023) by March 31, 2024. The Monitoring Reports must include:

⁶ https://www.waterboards.ca.gov/water_issues/programs/swamp/quality_assurance.html

- a. Answers to the Monitoring Questions, with scientifically defensible evidence to support the conclusions. Answers to monitoring questions must include: analyses and discussion of resurfacing groundwater discharge rates and nutrient loading into the Estuary, ambient water quality conditions in the River (dissolved and total nitrogen concentrations, and dissolved and total phosphorus concentrations), mass loading to the River, ambient water quality conditions in the Estuary, total nitrogen and total phosphorus mass loading to the Estuary from groundwater sources, and attainment of macroalgal biomass, dissolved oxygen, and Benthic Community Condition numeric targets in the Estuary.
- b. Raw field data, laboratory data reports, GIS data, and associated QA/QC performance reports.

COMPLIANCE DATES. The following is a list of the compliance dates for activities presented in the preceding Directives:

**Table 3
Order Compliance Dates**

Activity	Due Date
Submit Monitoring and Assessment Program Workplan	Within six months of issuance of the Order
Begin Monitoring and Assessment	Within 60 days of receiving Executive Officer's approval of Monitoring and Assessment Workplan
Implement Monitoring and Assessment Program	Monthly (April through October) for four years as soon as possible and ending in October 2023.
Submit Annual Monitoring Reports and Final Report	Each January 31 from 2021 through 2023; and a final 4-year report in March 2024.

Dischargers may seek extensions of schedule due dates with approval by the Executive Officer.

- 4. **PENALTY OF PERJURY STATEMENT:** All documents submitted to the San Diego Water Board under this Order must be signed by the Discharger's duly authorized representative, and must include the following statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

"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 fine and imprisonment for knowing violations."

- 5. DOCUMENT SUBMISSIONS:** Submit one electronic, searchable PDF copy of all documents required under this Order, as well as data files in MS Excel and/ or ArcGIS format as applicable, to SanDiego@waterboards.ca.gov, with the subject line "Santa Margarita River Estuary and Watershed Monitoring and Assessment Program Submission- ECM PIN CW-650655 attn: RPPU."

Hardcopies for informational purposes only can be sent to:

Executive Officer

California Regional Water Quality Control Board, San Diego Regio

2375 Northside Drive, Suite 100

San Diego, California 92108

Attn: Municipal Storm Water Program and Impaired Waters Restoration Team

ECM Place ID: CW-650655

- 6. CHANGES:** This Order may be amended, rescinded, or updated by the San Diego Water Board by Executive Officer authority. The Dischargers may propose changes or alternatives to the requirements in this Order if a valid and scientifically defensible rationale for the changes are shown. The filing of a request by a Discharger for amending, rescinding, or updating this Order, or notification of planned changes or anticipated noncompliance does not stay any condition of this Order.

7. PROVISIONS

- a. Good Operation and Maintenance:** The Dischargers must maintain in good working order and operate as efficiently as possible any monitoring system, site or control system installed to achieve compliance with this Order's requirements.

- b. Contractor/Consultant Qualifications:** All field and laboratory work, reports, plans and documents required under this Order must be prepared under the direction of appropriately qualified professionals. A statement of qualifications and license numbers, if applicable, of the responsible lead professional and all professionals making significant and/or substantive contributions must be included in the report submitted by the Dischargers. The lead professional performing engineering and geologic evaluations and judgments must sign and affix their professional geologist or civil engineering registration stamp to all technical reports, plans or documents submitted to the San Diego Water Board.
- c. Additional Receiving Water Monitoring and Reporting Requirements:** All contractors and subcontractors performing sample collection and /or analyses must comply with the following:
- i. **Quality Assurance Project Plan (QAPP):** Prior to commencing monitoring activity the Dischargers must prepare and submit a QAPP to the San Diego Water Board for review and approval. The QAPP must be prepared by a qualified individual and follow the requirements of the [2017 Surface Water Ambient Monitoring Program Quality Assurance Program Plan](#)⁷ as well as current standard of care. The SWAMP Advisor QAPP-creation tool, as well as a QAPP template and review checklist,⁸ can be used to assist in the development of the QAPP.
 - ii. **Approved QAPP:** All monitoring activities must comply with the requirements of the QAPP. All reports containing monitoring data collected under the QAPP must include a QAPP Compliance Report that describes and documents how the QAPP requirements were met.
 - iii. **California Environmental Data Exchange Network Reporting:** All surface water data, including laboratory and field QC results, collected under the QAPP must be submitted to the California Environmental Data Exchange Network (CEDEN). CEDEN data templates and documentation are available at: <http://ceden.org>. Prior to data collection, the CEDEN help desk must be contacted to register the project, obtain training on relevant data templates, and identify the Regional Data Center contractors used for data delivery.

⁷ https://www.waterboards.ca.gov/water_issues/programs/swamp/quality_assurance.html

⁸ <http://swamp.mpsl.mlml.calstate.edu/resources-and-downloads/quality-assurance/quality-assuranceproject-plan-guidance>

- iv. Monitoring and Assessment Program Kick-Off Meeting: Prior to conducting monitoring activities, a kick-off meeting must be held with representatives of the Dischargers, the San Diego Water Board, the monitoring personnel, and the analytical laboratory to discuss topics including, but not limited to:
 - a. Project scope.
 - b. Surface Water Ambient Monitoring Program Quality Assurance Program Plan requirements.
 - c. Monitoring and sampling requirements including, but not limited to, calibration, sampling protocols, holding times, QA/QC samples, and laboratory QA/QC requirements.
 - d. Deadlines for delivery of data and data delivery requirements.
- v. Laboratory Qualifications: All samples must be analyzed by laboratories accredited by the Environmental Laboratory Accreditation Program⁹ (ELAP) using methods approved by the USEPA for the type of analysis to be performed. All laboratories must maintain QA/QC records for San Diego Water Board review.
- vi. Laboratory Analytical Reports: Any report presenting new analytical data is required to include the complete Laboratory Analytical Report(s). The Laboratory Analytical Report(s) must be signed by the laboratory director and contain:
 - a. Complete sample analytical reports.
 - b. Complete laboratory QA/QC reports.
 - c. A discussion of the sample and QA/QC data.
 - d. A transmittal letter indicating whether or not the analytical work was supervised by the director of the laboratory, and contain the following statement, if true, "All analyses were conducted at an ELAP laboratory certified for such analyses by the California State Water Resources Control Board in accordance with current USEPA procedures."

⁹ The Environmental Laboratory Accreditation Program has been transferred to the California State Water Resources Control Board. More information is available here: https://www.waterboards.ca.gov/drinking_water/certlic/labs/

8. NOTIFICATIONS

- a. Enforcement Notification: Failure to comply with requirements of this Order or submission of a falsified report is a misdemeanor and may subject Dischargers to imposition of administrative civil liability pursuant to Water Code sections 13268 in an amount not to exceed \$1,000 for each day.
- b. Petitions: Any person who is aggrieved by this action may file a petition for review with the State Water Board pursuant to Water Code section 13320 and Title 23, California Code of Regulations (CCR) sections 2050-2068. Petitions must be received by the State Water Board within 30 days of this action. Instructions are available online at http://www.waterboards.ca.gov/public_notices/petitions/.

Ordered By: David W. Gibson 9 May 2019
Date
DAVID W. GIBSON
Executive Officer

Appendix A: *Draft Staff Report - Nutrients Total Daily Maximum Load Project for Santa Margarita River Estuary, California*, prepared by the California Regional Water Quality Control Board - San Diego Region, Last updated on July 31, 2018.

Appendix B:

- Figure 1. Example Surface Water Monitoring Locations on the Santa Margarita River.
- Figure 2. Santa Margarita River Estuary Surface Water Monitoring and Groundwater Monitoring Locations.

Appendix C: Summary of Requirements for Estuary and Watershed Monitoring and Assessment.

**APPENDIX A: Santa Margarita River Estuary, California.
Nutrients Total Maximum Daily Load Project Draft Staff
Report (July 2018)**

APPENDIX B: Santa Margarita River and Estuary Monitoring Locations

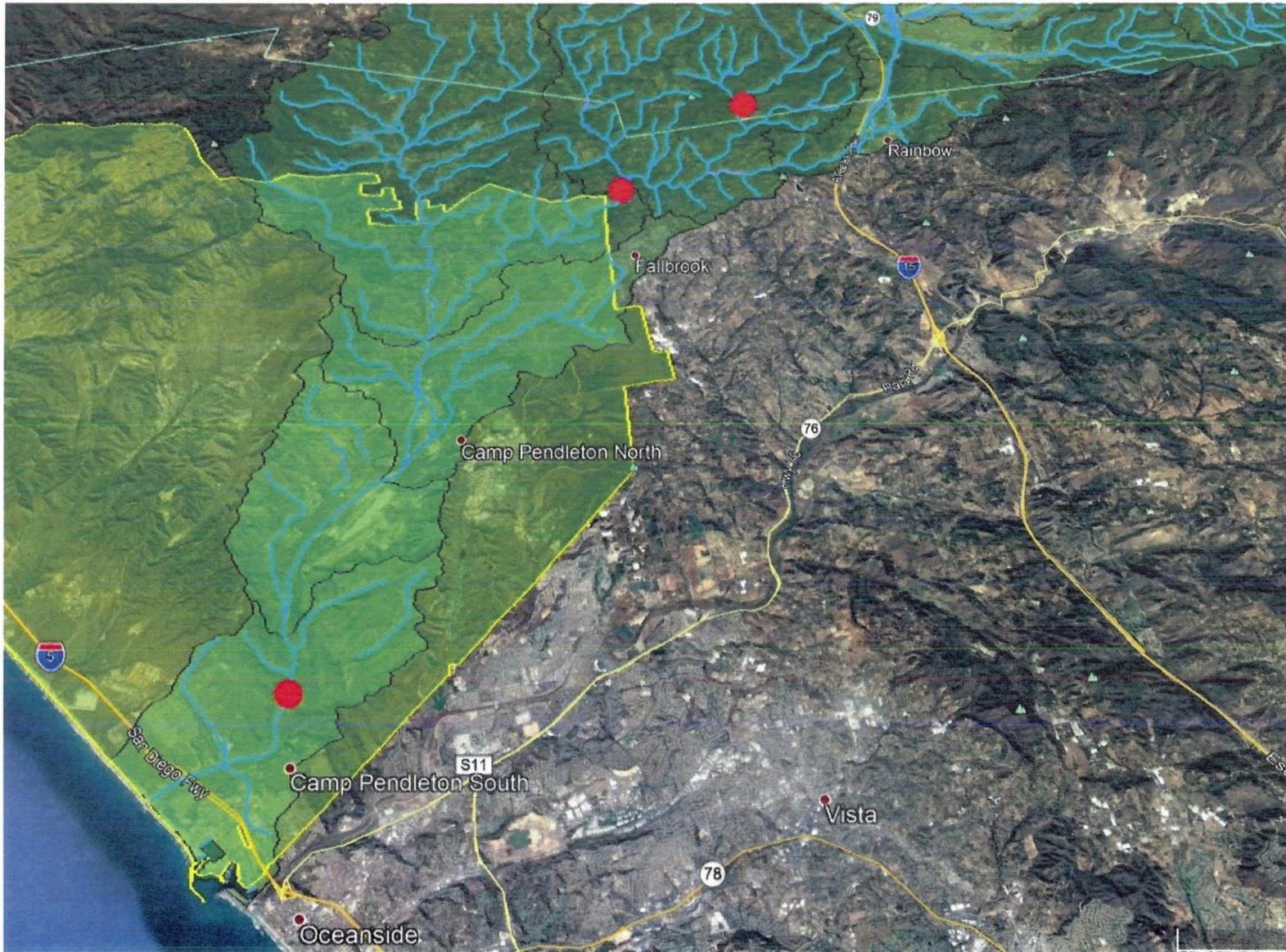


Figure 1. Example Surface Water Monitoring Locations on the Santa Margarita River (shown as red circles).



Figure 2. Santa Margarita River Estuary Surface Water Monitoring and Groundwater Monitoring Locations. Three Estuary segments to be monitored are indicated by green circles with numbers, the general location for surfacing groundwater monitoring stations are shown as gold-colored boxes with an "x" in the center.

APPENDIX C: Summary of Requirements for Estuary and Watershed Monitoring and Assessment

Parameter	Duration	Depth	Sites	Frequency	Method(s)
Estuary Resurfacing Groundwater Discharge Rates and total and dissolved inorganic nitrogen and phosphorous loading	As needed	N/A	Former Stuart Mesa Agricultural Fields	Biannual Winter dry and summer dry monitoring	Applicable Standard Methods Monitoring efforts include a QAPP and must be led by State Certified Geologist
Estuary Dissolved Oxygen (mg/l and percent saturation), temperature, pH, salinity/ conductivity, turbidity, water depth, and degree of tidal muting or influence	April-October and during winter period (including 3 monitoring periods)	Near-surface ~0.5 meters	2 sites: I-5 bridge and Stuart Mesa bridge	Continuous monitoring at 15-minute intervals	Data sonde with optical sensor. In accordance with applicable SCCWRP Southern California Bight Regional Monitoring Program protocols
Estuary surface water chlorophyll a, total and dissolved inorganic nitrogen and phosphorous concentrations	April-October and during winter period (Including 3 monitoring events)	Near surface ~0.5 meters	2 sites: I-5 bridge and Stuart Mesa bridge	April-October and 3 times during winter dry weather	Applicable SWAMP and Standard Methods

Parameter	Duration	Depth	Sites	Frequency	Method(s)
Estuary Macroalgal Biomass	April-October	Intertidal or subtidal as appropriate within the three regions of Estuary – below I-5 bridge, above Stuart Mesa bridge until vegetation changes, and between the two bridges	Macroalgal biomass samples harvested representatively from each of three regions	Monthly	Standard Operating Procedure (SOP) for Macroalgal Collection in Estuarine Environments. SCCWRP Technical Report #872
Estuary Benthic Community Condition, Sediment %OC, %N and %P, and sediment grain size	As needed	At depths that align with Macroalgal sampling (so that relationships between Benthic Community Condition and other parameters may be logically inferred)	Three randomly distributed sites for each of three regions in Estuary	Once per year in the late summer	Standard methods (Sediment Quality Assessment Technical Support Manual, SCCWRP Tech Report 582, 2009). Once accepted methods are available to estimate the effect of sediment organic matter (eutrophication) upon benthic macroinvertebrate communities, they may be considered for use
Santa Margarita River water flow, temperature, conductivity, ambient total and dissolved inorganic nitrogen and phosphorous	Monthly (May-October) and Bi-Monthly (November-March)	N/A	A minimum of one site for San Diego County, Riverside County, and USMC Base Camp Pendleton. Continuous flow	Monthly, May through October and Bi-Monthly thereafter (including November, January, March)	Standard Operating Procedures for the collection of field data for bioassessments of California wadable streams: benthic macroinvertebrates, algae, and physical habitat (Bioassessment SOP)