CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

TENTATIVE

INVESTIGATIVE ORDER NO. R9-2019-0007

AN ORDER DIRECTING
THE CITIES OF MENIFEE, 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 Menifee, 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 to 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. The Findings in this Order, and its attachments, provide the explanation and evidence supporting the requirements of this Order.

3. **Estimated Implementation Costs of Investigative Order:** The estimated costs associated with the implementation of the directives included in this Investigative Order are provided in Table 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 Ten Years of Monitoring and Reporting
Prepare Workplan and QAPP	One Time Cost	$30,000
Field Work	$250,000	$2,500,000
Laboratory Analysis, Materials, Supplies	$200,000	$2,000,000
Report Preparation	$75,000	$750,000
Estimated Total	$525,000	$5,280,000

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 provides important refuge, foraging areas, and breeding grounds 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 (*Sterna antilarum browni*), Western Snowy Plover (*Charadrius alexandrines nivosus*), Tidewater Goby (*Eucyclogobius newberryi*), Belding's Savannah Sparrow (*Passerculus sandwichensis beldingi*), Light-footed Ridgway's Rail (*Rallus obsoletus levipes*), and Southern California Steelhead (*Oncorhynchus mykiss*).

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, Menifee, 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 its 750 square mile 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 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: The numeric interpretation of the biostimulatory substances WQO for inland surface waters, enclosed bays and estuaries, and coastal lagoons is:

        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 lacking, 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 Estuary was placed on the Clean Water Act section 303(d) List of Water Quality Limited Segments (303(d) List) in 1996 due to eutrophic conditions.

   Eutrophic conditions in the Estuary are caused, in part, by excess nutrient loading from polluted groundwater, agricultural discharges, and upstream non-storm water and illicit discharges from upstream Municipal Separate Storm Sewer Systems (MS4s). Loading of nutrients to the Estuary, combined with reduction of tidal flushing due to the buildup of a sand berm at the mouth of the Estuary, higher surface water temperatures, lower salinity, and longer duration of daylight (especially during the summer months) promotes excessive macroalgal growth. These macroalgal blooms eventually collapse due to self-shading — blocking of sunlight required for photosynthesis caused by overcrowding — leading to rapid algal die off and decomposition. Also, because the decay of macroalgae is an aerobic bacterial decomposition process, the breakdown of dead algae reduces the dissolved oxygen content of the Estuary to concentrations that impair 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. The impairment of the Estuary impacts sensitive species like salmonids and designated EST, MIGR, RAR, SPWN, REC-1, and REC-2 beneficial uses.

10. **Water Quality Impairment of Santa Margarita River Estuary:** 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. The impairment is primarily limited to dry-weather conditions.

    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 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 m^2) would indicate eutrophic conditions. The results from Investigative Order No. R9-2006-0076 found high average macroalgal biomass (1465 to 1714 g wet weight m^2) and macroalgal cover of up to 100 percent. 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 m^2, almost five times above the 90 g dry weight m^2 threshold where biological integrity is likely to be impacted, as discussed in the section 6, Numeric Targets, of the Draft Staff Report (Appendix A).

    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 municipal separate storm sewer systems (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.

    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 rising polluted groundwater beneath adjacent former agricultural fields continues to take place today.

11. **Purpose and Definition of Total Maximum Daily Load:** A Total Maximum Daily Load (TMDL) is a calculation of the loading capacity that can be assimilated by the Estuary for each impairing pollutant. A TMDL is a planning tool for restoring water quality conditions that support designated beneficial uses by identifying the assimilative capacity of a water body, estimating uncontrollable load allocations, and assigning waste load allocations to sources that can be controlled.

    The calculations can also be used to support an alternative approach to a formal TMDL if there are regulatory mechanisms (e.g. NPDES permits and WDRs) with requirements that can achieve the load reductions necessary to meet the calculated TMDL.

12. **Estuary TMDL Project and Calculations:** The San Diego Water Board in collaboration with the Santa Margarita River Estuary Watershed Nutrient Initiative Stakeholder Group 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 a Draft Staff Report (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, or other regulation, as necessary.

    The Draft Staff Report calculated 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 (Appendix A) 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).

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 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 (SQO) scale)	Winter Dry and Summer Dry

15. **Nutrient Numeric Endpoints:** The San Diego Water Board developed the final numeric targets for the Estuary through a stakeholder process. To develop these numeric targets, the San Diego Water Board in collaboration with the Santa Margarita River Watershed Nutrient Initiative Stakeholder Group (Stakeholder Group) used the nutrient numeric endpoint (NNE) framework approach for California estuaries developed by SCCWRP for the State Water Board. Stakeholder Group members and technical advisors that participated in the development of 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
- United States Marine Corps Base Camp Pendleton

The NNE framework provides a scientifically defensible methodology for interpreting the narrative biostimulatory WQO, and this Investigative 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). The NNE approach ensures the control of excess 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 protected.

16. **Estuary Water Quality Restoration Approach:** According to the analysis presented in the Draft Staff Report (Appendix A), the enforcement and full implementation of the prohibitions and requirements in the Regionwide Agricultural Waste Discharge Requirements (WDRs), Regional MS4 Permit, and Statewide Phase II MS4 Permit, combined with natural attenuation of polluted groundwater sources is expected to achieve the load reductions necessary to restore the beneficial uses of the Estuary.

    As discussed in the Draft Staff Report, this approach is realistic because after the 2006 Investigative Order that found widespread eutrophication, two major sources of nutrients to the Estuary have ceased 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 (MS4 dischargers) and 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 the Santa Margarita River, Estuary, and tributaries. MS4 dischargers are regulated by National Pollutant Discharge Elimination System (NPDES) permit requirements in San Diego Water Board Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100 (Regional MS4 Permit), and the requirements of State Water Board Order No. 2013-0001-DWQ (Statewide Phase II MS4 Permit). The owners and operators of NPDES MS4s subject to this order include the following entities:

- County of Riverside
- City of Menifee
- 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

MS4 agencies have land use authority over agricultural discharges and are responsible for dry weather flows, including those from agricultural land uses, that enter and are discharged from their MS4 systems.

Caltrans is not subject to this Investigative Order because their overall land footprint in the watershed is very small (less than one percent of the total Watershed area). 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).

18. **Agricultural Discharges:** Owners and operators of agricultural operations in the Santa Margarita River Watershed are not subject to this Investigative Order. Agricultural discharges in the San Diego Region are subject to San Diego Water Board Order Nos. R9-2016-0004 and R9-2016-0005 (Regionwide Agricultural WDRs). The Regionwide Agricultural WDRs (R9-2016-0004 and R9-2016-0005) 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.

    Regionwide Agricultural WDRs require 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. Monitoring plans have been submitted to the San Diego Water Board by commercial agricultural operations in the Santa Margarita Watershed including sites in Sandia Creek and Devils Creek.

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

20. **Assessment of Progress Towards Estuary Restoration:** The San Diego Water Board will consider every five years whether additional parties should be named or if existing parties should be removed. In 2025 and 2030, or at intervals that coincide with permit and WDR reissuance, the San Diego Water Board will evaluate whether continuation or other actions, including requiring a TMDL, are necessary to determine the Estuary conditions and ensure eutrophication is no longer causing impairments.

21. **Need for and Benefit of Technical and Monitoring Reports:** Surface water monitoring of the Estuary and the main stem of the Santa Margarita River is necessary to:

    a. Evaluate whether Estuary conditions are improving based on NNE indicators, and

    b. Verify assumptions of linkage between loading in the River (including the fate and transport) and the conditions of the Estuary.

    Based on the relationship of the 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.

22. **California Environmental Quality Act (CEQA) Requirements:** This Order is an action to assure the restoration of beneficial uses in 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.

23. **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.

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 Santa Margarita Estuary Stakeholder Group members and the public on **TBD**.

d. A public informational meeting on **date** 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 have been considered.

24. **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 Investigative Order, the Draft Staff Report (Appendix A) 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/

25. **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 [describe notice given].

26. **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.

27. **Qualified Professionals:** Qualified professionals are necessary for conducting the necessary 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.

28. **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/.

IT IS HEREBY ORDERED, pursuant to Water Code section 13267, that the Cities of Menifee, 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) that adheres to the applicable guidelines in Section 12.3 of the Draft Staff Report (Appendix A) for approval **no later than 6 months after the date this Order is issued**. 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 phosphorous to the River and Estuary reduced to levels that do not exceed the calculated assimilative capacity of the Estuary? Do monitoring results confirm the assumption that the implementation and enforcement of existing NPDES permits and WDRs is sufficient to bring about the necessary nutrient load reductions to restore the Estuary in accordance with the schedule provided in the Draft Staff Report (Appendix A)?

        ii. Are the Estuary numeric targets in Finding 16 and the Draft Staff Report for macroalgal biomass, dissolved oxygen, and Benthic Community Condition being achieved and sustained? If not, what are the primary stressors causing unsatisfactory conditions?

        iii. Are Rainbow Creek, Sandia Creek, and Devils Creek a major source of total nitrogen and total phosphorus to the Santa Margarita River and Estuary? Are there any other tributaries that constitute a major source of total nitrogen and total phosphorus loading to the Santa Margarita River and Estuary?

b. Monitoring and Assessment of Estuary: Estuary monitoring and assessment must be implemented in accordance with the applicable guidelines provided in Section 12.3 of the Draft Staff Report (Appendix A). 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. Resurfacing groundwater from the former Stuart Mesa Agricultural Fields and the Santa Margarita Valley Basin must be monitored.

ii. Monitoring of Estuary ambient water quality conditions and trends towards meeting numeric targets (Table 1) 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, including from Rainbow Creek, Sandia Creek, and Devils Creek.

b. Monitoring of Estuary ambient water quality conditions, including year-round continuous measurement of dissolved oxygen concentrations and saturation, water temperature, pH, salinity/conductivity, and water depth. Continuous year-round dissolved oxygen concentration and saturation monitoring (at 15-minute intervals) must occur at two sites (adjacent to I-5 bridge and Stuart Mesa bridge) and at depths adequate to determine attainment of EST, MIGR, RARE and EST beneficial uses.

c. Monthly (April to October) monitoring of total suspended solids, chlorophyll a, turbidity, and Estuary mouth condition (i.e., physical presence of berm).

d. Monthly (April to October) monitoring of macroalgal biomass in the Estuary in accordance with the following guidelines:

1) Measurements must be made in the intertidal and or subtidal within the three regions of the Estuary: 1) below I-5 bridge, 2) above Stuart Mesa bridge until vegetation changes, 3) and between the two bridges (Appendix B- Figure 2).

2) A total of at least 30 square meter grid samples for macroalgal biomass must be collected throughout the Estuary using a stratified random distribution according to size of each of the three Estuary regions.

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 are logically 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 the summer.

4) Sediment grain size, sediment total organic carbon, sediment total nitrogen, and sediment total phosphorus samples must be collected at each site.

Estuary monitoring requirements are summarized in Appendix C.

c. Monitoring and Assessment of Santa Margarita River and Watershed

i. The Monitoring and Assessment Workplan must include monthly (April to October) monitoring of the Santa Margarita River and major tributaries to determine flow and ambient water quality conditions relevant to eutrophication in the Estuary. Parameters to be measured must include: water temperature, conductivity, dissolved oxygen, pH, benthic algal biomass, ash free dry mass, chlorophyll a, shading canopy, total dissolved solids, total suspended solids, turbidity, flow, total nitrogen, total phosphorus concentrations (dissolved and whole water), and total nitrogen and total phosphorus mass loading.

a. Monitoring must be temporally representative of flows and tides (capturing monthly, weekly, daily, hourly temporal variability in flow) to demonstrate if total nitrogen and total phosphorus loads are being sufficiently reduced to meet Estuary numeric targets.

b. Monitoring locations on the main stem of the Santa Margarita River and major tributaries must include at least one monitoring site for Camp Pendleton, San Diego County, and Riverside County (Appendix B – Figure 1). The monitoring site must be positioned at the downstream-most point along the Santa Margarita River or major tributary within a Discharger's jurisdiction, 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 WQOs and draft Estuary TMDLs. The frequency of monitoring may be reduced over time, with the approval of the San Diego Water Board Executive Officer, following a minimum of three representative water years of monitoring based on a comparison with available meteorological data.

c. A minimum of 33 samples should be collected monthly (April to October) for the determination of benthic algal biomass, ash free dry mass, and chlorophyll a following the guidelines of the most recent Surface Water Ambient Monitoring Program (SWAMP) protocol for sampling streams. The additional sampling effort beyond the 11 samples required under the SWAMP algal biomass sampling protocol will provide more reliable data given the high algal biomass spatial heterogeneity observed in the River.

d. Dischargers must determine dry-weather nutrient loading into the Santa Margarita River from Rainbow Creek, Sandia Creek, and Devils Creek.

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 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.

vi. An assessment of trends with projections for when the numeric targets would be achieved based on those data collected.

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 each year beginning in 2020. The Monitoring Reports must include:

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, total nitrogen and total phosphorus (dissolved and whole water) concentrations and mass loading to the River, ambient water quality conditions in the Estuary, total nitrogen and total phosphorus mass loading to the Estuary, 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.

c. Report on nutrient mass loading to the River from agricultural drainages including but not limited to Rainbow Creek, Sandia Creek, and Devils Creek.

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

Table 3
Investigative Order Compliance Dates

Activity	Due Date
Submit Monitoring and Assessment Program Workplan	Within six months of issuance of the Investigative 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 ten years beginning in 2019 and ending in 2028.
Submit Annual Monitoring Reports	Each January 31 from 2020 through 2029.

5. 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."

6. **DOCUMENT SUBMISSIONS:** Submit one electronic, searchable PDF copy of all documents required under this Order to SanDiego@waterboards.ca.gov, with the subject line "Santa Margarita River Estuary and Watershed Monitoring and Assessment Program Submission-ECM PIN 650655 attn: RPPU."

   Hardcopies for informational purposes only can be sent to:

   Executive Officer
   California Regional Water Quality Control Board, San Diego Region
   2375 Northside Drive, Suite 100
   San Diego, California 92108
   Attn: Municipal Storm Water Program and Impaired Waters Restoration Team ECM Place ID: CW-650655

7. **CHANGES:** This Investigative Order may be amended, rescinded, or updated by the San Diego Water Board. The Dischargers may propose changes or alternatives to the requirements in this Investigative 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 Investigative Order, or notification of planned changes or anticipated noncompliance does not stay any condition of this Investigative Order.

   The San Diego Water Board shall consider after five years whether additional parties should be named or if existing parties should be removed. At 2030, if not sooner, the San Diego Water Board shall evaluate whether continuation of this Investigation or other action is necessary to determine the Estuary conditions and ensure eutrophication is no longer causing impairments.

8. **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: 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 *2008 Surface Water Ambient Monitoring Program Quality Assurance Program Plan*[1] as well as current standard of care. The SWAMP Advisor QAPP-creation tool, as well as a QAPP template and review checklist,[2] must 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.

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:

[1] http://www.waterboards.ca.gov/water_issues/programs/swamp/tools.shtml#qa

[2] http://swamp.mpsl.mlml.calstate.edu/resources-and-downloads/quality-assurance/quality-assuranceproject-plan-guidance.

a) Project scope.

b) Surface Water Ambient Monitoring Program Quality Assurance Program Plan requirements.

c) QAPP requirements.

d) Monitoring and sampling requirements including, but not limited to, calibration, sampling protocols, holding times, QA/QC samples, and laboratory QA/QC requirements.

e) 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 Program[3] (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 a laboratory certified for such analyses by the California Department of Public Health in accordance with current USEPA procedures."

[3] 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/

9. 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.

I, David W. Gibson, Executive Officer, do hereby certify the forgoing is a full, true, and correct copy of Investigative Order No. R9-2019-TBD, issued on DATE.

TENTATIVE
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, TBD.

Appendix B: Figure 1. 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 Discharger main-stem monitoring locations along the Santa Margarita River.

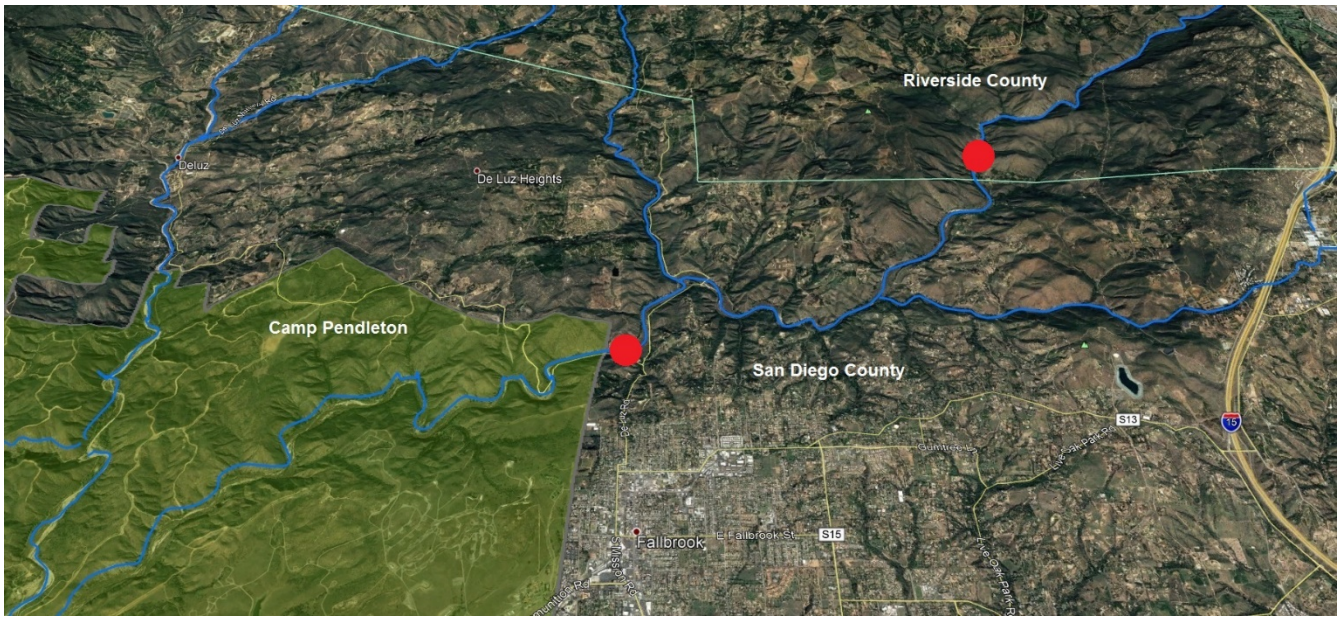

Figure 2. Three Estuary segments to be monitored are indicated by green circles with numbers, general location for surfacing groundwater monitoring stations are shown as gold-colored boxes with an “x” in the center, and approximate location of a nutrient mass loading station is shown as a solid red circle. Arrow indicates that the mass loading and groundwater monitoring sites may be located further upstream within the confines of U.S. Marine Corps Base Camp Pendleton.

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

Parameter	Duration/Time Frame	Depth	Sites	Frequency	Method
Resurfacing Groundwater Discharge Rates and TN and TP loading into Estuary	As needed	N/A	Former Stuart Mesa Agricultural Fields & Santa Margarita Valley Basin	Yearly	Applicable Standard Methods
Estuary Dissolved Oxygen (mg/l and percent saturation), temperature, pH, Salinity/conductivity, and water depth.	Year round	Near-surface ~ 0.5 meters	2 sites: I-5 bridge and Stuart Mesa bridge	Continuous monitoring at 15 min. intervals	Data sonde with optical sensor
Estuary surface water total suspended solids, chlorophyll a, and turbidity and mouth condition.	April-October	Near-surface ~ 0.5 meters	2 sites: I-5 bridge and Stuart Mesa bridge	Monthly	Applicable SWAMP and other Standard Methods
Estuary Macroalgal Biomass, Macroalgal, total suspended solids, surface water TN and TP concentrations, turbidity, water depth, and mouth condition.	April – October	Intertidal and or subtidal within the three regions of Estuary - below I-5 bridge, above Stuart Mesa bridge until vegetation changes, and between the two bridges.	A total of 30 samples for each parameter collected throughout the estuary using a stratified random distribution according to size of each of the three Estuary regions. Macroalgal biomass samples harvested representatively from each of three regions.	Monthly	Macroalgal collection and processing procedures used by McLaughlin *et al.* (2012, 2013a, 2013b) and other applicable regional or statewide protocols.
Estuary Benthic Community Condition, Sediment %OC, sediment %N and %P, and sediment grain size.	Standard indexing period	At depths that align with the Macroalgal sampling (so that relationships between Benthic Community Condition and other parameters are logically inferred).	Three randomly distributed sites for each of three regions in estuary.	Once per year in the summer.	Standard methods (Sediment Quality Assessment Technical Support Manual, SCCWRP Tech Report 582, 2009). Once accepted methods are developed to monitor algal biomass effects (eutrophication effects) upon benthic macroinvertebrate communities, they may be considered for use.

Parameter	Duration/Time Frame	Depth	Sites	Frequency	Method
Santa Margarita River Flow, TN and TP Loading into Estuary (Including dry-weather nutrient loading from Rainbow Creek, Sandia Creek, and Devils Creek into Santa Margarita River).	April - October	N/A	A minimum of one Mass Loading site for San Diego County, Riverside County, and USMC Base Camp Pendleton. Mass loading measurements at lowermost site conducted at outgoing tide (MLLW).	Monthly	As per Regional MS4 Permit mass loading monitoring requirements
Santa Margarita River water flow, temperature, conductivity, dissolved oxygen, pH, benthic algal biomass, ash free dry mass, chlorophyll a, shading canopy, and ambient TN and TP concentrations.	April - October	N/A	A minimum of one site for San Diego County, Riverside County, and USMC Base Camp Pendleton. .	Monthly	Applicable SWAMP and Standard Methods