

**STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION**

STAFF REPORT FOR REGULAR MEETING OF June 16-17, 2022

Prepared on May 31, 2022

ITEM NUMBER: 8

SUBJECT: Proposed Amendment to the Water Quality Control Plan for the Central Coastal Basin to Establish Total Maximum Daily Loads for Organophosphate Pesticides and Toxicity in the Lower Salinas River Watershed, Monterey County, California

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ACTION: Adopt Resolution No. R3-2022-0020

SUMMARY

Staff recommends the Central Coast Regional Water Quality Control Board (Central Coast Water Board) adopt Resolution No. R3-2022-0020 establishing Total Maximum Daily Loads (TMDLs) for organophosphate pesticides and toxicity in the lower Salinas River watershed and the associated implementation plan (TMDL Project). Adoption of this Resolution will amend the Water Quality Control Plan for the Central Coastal Basin (Basin Plan) to establish these TMDLs and the implementation plan to reduce organophosphate pesticides and water column toxicity (toxicity). The TMDL implementation plan describes how the Central Coast Water Board's regulatory mechanisms (e.g., permits and enforcement actions) will address organophosphate pesticide loading and toxicity from various sources and attain water quality standards¹ necessary to restore aquatic life habitats.

The federal Clean Water Act section 303(d) List of impaired waters identifies several streams in the lower Salinas River watershed as impaired due to one or more of the following conditions: excessive concentrations of the organophosphate pesticides chlorpyrifos, diazinon, and malathion, or toxicity. This TMDL Project addresses the impairment(s) of the following waterbodies: Moro Cojo Slough, Old Salinas River, Salinas River Lagoon (North), Tembladero Slough, Merritt Ditch, Alisal Slough, Alisal Creek, Blanco Drain, Salinas Reclamation Canal, lower Salinas River, Espinosa Slough, Gabilan Creek, Natividad Creek, Santa Rita Creek, Quail Creek, and Chualar Creek. This Project addresses these water quality impairments by assigning TMDL allocations to sources of organophosphate pesticides in the watershed and by describing an implementation plan to achieve those allocations.

¹ USEPA defines water quality standards as consisting of three elements: designated uses for each waterbody, criteria to protect those uses, and consideration of the anti-degradation requirements.

The goal of this TMDL Project is to restore water quality in the lower Salinas River watershed and achieve the water quality objectives for pesticides and toxicity, thereby protecting the designated beneficial uses of each waterbody (i.e., attaining water quality standards). Achieving this goal will also allow for removal of organophosphate pesticide and toxicity impaired waters from the 303(d) List.

DISCUSSION

Background

The lower Salinas River watershed encompasses an area of approximately 405 square miles in northern Monterey County (Figure 1). The project area extends north from the City of Gonzales to Monterey Bay and the Pacific Ocean. There are two major subwatersheds in the TMDL Project area, which terminate at Moss Landing Harbor: the lower Salinas River and its tributaries, and the Salinas Reclamation Canal and its tributaries.

On May 5, 2011, the Central Coast Water Board adopted Resolution R3-2011-0005,² which established TMDLs for chlorpyrifos and diazinon in the lower Salinas River watershed. In accordance with the Water Quality Control Policy for Addressing Impaired Waters (Impaired Waters Policy; SWRCB, 2005³), the 2011 TMDLs were adopted as a single regulatory action (i.e., adoption by a single vote of the regional board, followed by EPA approval) rather than an amendment to the Basin Plan subject to approval by the State Water Board and Office of Administrative Law. The Impaired Waters Policy states that when a TMDL and its implementation plan can be adopted as a single regulatory action by the regional board, such as a permit, a waiver, or an enforcement order that is designed by itself to correct the water quality impairment, there is no legal requirement to adopt the TMDL and implementation plan through a basin plan amendment. Agriculture is the only source of chlorpyrifos and diazinon impairments in the lower Salinas River watershed and the requirements contained in the mechanism regulating discharges of agricultural waste at that time were expected to address the impairments.

On April 15, 2021, the Central Coast Water Board reestablished the TMDLs for chlorpyrifos and diazinon in the lower Salinas River watershed as another single regulatory action when it adopted the General Waste Discharge Requirements for Discharges from Irrigated Lands, Order No. R3-2021-0040 (Agricultural Order)⁴. In adopting the Agricultural Order, the Central Coast Water Board reviewed Resolution R3-2011-0005, the project report for the lower Salinas River watershed chlorpyrifos and diazinon TMDLs, and the supporting technical documentation for the TMDLs and found that implementation of the Agricultural Order and associated monitoring and reporting program will resolve water quality impairments and continue to provide the appropriate requirements to address the water quality impairments.

The new TMDLs, as contained herein, will be established through an amendment to the Basin Plan and will supersede the TMDLs that were reestablished in 2021. The TMDLs

²https://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/salinas/pesticide/sal_op_tmdl_signed_resln.pdf

³https://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/iw_policy.pdf

⁴https://www.waterboards.ca.gov/centralcoast/water_issues/programs/ilp/docs/ag_order4/2021/ao4_order.pdf

for chlorpyrifos and diazinon remain unchanged from those reestablished in 2021 while the malathion TMDLs are new.

Chlorpyrifos, diazinon, and malathion are man-made pesticides primarily used in the lower Salinas River watershed for agricultural purposes, however, malathion is also used in urban areas and therefore will require more than one regulatory mechanism (permit) to address the impairments. The agricultural application of chlorpyrifos and diazinon has declined significantly since 2006. Malathion application rates for agricultural purposes have remained consistently high and detection in surface waters has significantly increased since 2006. Non-industrial malathion application rates in urban areas are not reported.

These organophosphate pesticides have synergistic or additive effects on aquatic organisms. Surface waters that contain a mixture of organophosphate pesticide compounds can be toxic to aquatic organisms when the concentration of any individual pesticide is below a threshold of concern. The addition of malathion to the evaluation of additive effects increases the accuracy of additive toxicity calculations (Table 2).

Toxicity to aquatic invertebrates continues to be a significant issue in the lower Salinas River watershed. All waterbodies within the Project area exhibit significant toxicity to one or more invertebrate test organisms. Although the water flea (*Ceriodaphnia dubia*) is the toxicity test organism that is most “sensitive” to organophosphate pesticides, sublethal effects such as reduced growth or reproduction of other invertebrate test organisms has been attributed to organophosphate pesticides and additive effects of organophosphate pesticides.

Data Sources

To develop this TMDL Project, staff used various types of data including the following: water quality, land use, hydrologic, climatic, soils, ecological, demographic, groundwater, and other environmental data from public agencies and scientific sources. Data acquisition, compilation, and analyses are described more fully in the TMDL Project Technical Report (Attachment 2, Section 6).

Numeric Targets

Numeric targets are the TMDL Project goals that define the conditions necessary to protect designated beneficial uses of waters and define the TMDL allocations. This TMDL Project establishes acute and chronic numeric targets for each of the organophosphate pesticides; chlorpyrifos, diazinon, and malathion when present individually (Table 1). Concentration units are parts per billion (ppb) which are equivalent to micrograms per liter (ug/L).

Table 1. Water column numeric targets for individual organophosphate pesticides.

Compound	CMC ^A (ppb)	CCC ^B (ppb)
Chlorpyrifos	0.025	0.015
Diazinon	0.16	0.10
Malathion	0.17	0.028

^A. CMC – Criterion Maximum Concentration or acute (1- hour average). Not to be exceeded more than once in a three-year period.

^B. CCC – Criterion Continuous Concentration or chronic (4-day (96-hour) average). Not to be exceeded more than once in a three-year period.

These three organophosphate pesticides share the same mechanism of toxic action and exhibit additive toxicity to aquatic invertebrates, therefore this TMDL Project establishes an additive toxicity numeric target when two or more organophosphate pesticides are present in the water column (Table 2). The additive toxicity numeric target is defined as the sum (S) of the concentration of chlorpyrifos divided by the numeric target for chlorpyrifos, plus the concentration of diazinon divided by the numeric target for diazinon, plus the concentration of malathion divided by the numeric target for malathion, that is equal to or less than one ($S \leq 1$). A sum greater than one ($S > 1$) does not support beneficial uses due to the additive toxicity of one or more of these organophosphate pesticides (chlorpyrifos, diazinon, and malathion). Table 2 presents the equation for the additive toxicity numeric target.

Table 2. Equation for additive toxicity numeric target ($S \leq 1$).

$\frac{C \text{ Chlorpyrifos}}{NT \text{ Chlorpyrifos}} + \frac{C \text{ Diazinon}}{NT \text{ Diazinon}} + \frac{C \text{ Malathion}}{NT \text{ Malathion}} = S; S \leq 1$
<p>Where:</p> <p>C = the concentration of a pesticide measured in the receiving water.</p> <p>NT = the numeric target for each pesticide present.</p> <p>S = the sum; a sum exceeding one (1.0) indicates that beneficial uses may be adversely affected.</p>

In addition to the concentration-based numeric targets above, this TMDL Project will also establish an aquatic toxicity numeric target stated as the following:

No significant toxic effect to the survival or sublethal (i.e., growth, reproduction, etc.) test endpoint.

The basis for the development of the numeric targets is contained with the TMDL Project Technical Report (Attachment 2, Section 7).

Source Analysis

Several methods were used to identify sources of organophosphate pesticides in the watershed including water quality monitoring results from various programs, pesticide use reports provided by the California Department of Pesticide Regulation, special studies, field observations, and discussions with stakeholders. The main source of organophosphate pesticides and aquatic toxicity is irrigated agriculture, while various stormwater discharges (urban, construction, and industrial) are considered minor sources of malathion and aquatic toxicity. Other potential sources of organophosphate pesticides and aquatic toxicity include cannabis cultivation facilities and pesticide handling facilities, though these potential sources have not been confirmed to contribute to the identified impairments. The source analysis is contained within the TMDL Project Technical Report (Attachment 2, Section 8).

TMDLs

A TMDL is the maximum amount of a pollutant that a waterbody can receive while still meeting water quality standards. The TMDLs for organophosphate pesticides in the lower Salinas River watershed are the same numeric value as the individual acute and chronic organophosphate pesticide receiving water numeric targets identified in Table 1 and the additive toxicity organophosphate pesticides receiving water numeric targets referenced in Table 2.

Waterbodies in the lower Salinas River watershed assigned organophosphate pesticide TMDLs are listed in Table 3.

Table 3. Waterbodies assigned TMDLs.

Moro Cojo Slough
Old Salinas River
Salinas River Lagoon (North)
Tembladero Slough
Merritt Ditch
Alisal Slough
Alisal Creek
Blanco Drain
Salinas Reclamation Canal (Lower)
Salinas Reclamation Canal (Upper)
Salinas River
Espinosa Slough
Gabilan Creek
Natividad Creek
Santa Rita Creek
Quail Creek
Chualar Creek

TMDL Allocations

To address organophosphate and toxicity impairments in the lower Salinas River watershed, TMDLs are allocated to point and nonpoint sources of discharge. Point

source discharges, such as urban stormwater, are regulated with NPDES permits and are assigned wasteload allocations, while nonpoint sources, such as irrigated agricultural discharges, are considered nonpoint sources and are assigned load allocations. For this TMDL Project, the wasteload allocations presented in Table 4 and the load allocations presented in Table 5 are both equal to the organophosphate pesticide TMDLs.⁵ These load and wasteload allocations are assigned to responsible parties as receiving water allocations for the waterbodies listed in Table 3.

Table 4. Wasteload allocations.

Responsible Party	Permit/Order	Source	Allocation
City of Salinas	Phase I MS4 Stormwater Permit (Order No. R3-2019-0073, NPDES No. CA0049981)	Municipal stormwater	As contained in: Table 1 Table 2
County of Monterey	State Water Board Phase II MS4 General Stormwater Permit (Order No. 2013-0001 DWQ)	Municipal stormwater	As contained in: Table 1 Table 2
Industrial General Permit enrollees	Industrial General Permit (Order No. 2009-0009 amended by Order No. 2014-0057-DWQ, NPDES No. CAS000001)	Industrial stormwater	As contained in: Table 1 Table 2
Construction General Permit enrollees	Construction General Permit (Order No. 2012-0006-DWQ, NPDES No. CAS000002)	Construction stormwater	As contained in: Table 1 Table 2

Table 5. Load Allocations.

Responsible Party	Permit/Order	Source	Allocation
Owners/operators of irrigated agricultural lands or facilities	General Waste Discharge Requirements for Discharges from Irrigated Lands (Order No. R3-2021-0040)	Irrigated agriculture, nurseries, greenhouses	As contained in: Table 1 Table 2
Owners/operators of cannabis cultivation facilities	General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Dischargers of Waste Associated with Cannabis Cultivation Activities (Order No. WQ 2019-0001-DWQ)	Cannabis cultivation, nurseries, greenhouses	As contained in: Table 1 Table 2

⁵ The terms “wasteload allocation” and “load allocation” are functionally equivalent, and they are only used to differentiate between allocations assigned to point source discharges and nonpoint source discharges, respectively.

Responsible Party	Permit/Order	Source	Allocation
Handlers of fertilizer or pesticides subject to Waste Discharge Requirements	General Waste Discharge Requirements for Fertilizer/Pesticide Handling (Order No. R3-2005-0001) and Individual Waste Discharge Requirements (Orders)	Fertilizer/pesticide handling facilities	As contained in: Table 1 Table 2

Implementation Plan

The TMDL Project Technical Report (Attachment 2) and Basin Plan amendment (Attachment A to the proposed Resolution adopting these TMDLs) include an implementation plan that identifies the regulatory mechanisms and the actions necessary for responsible parties to meet their TMDL allocations. In summary, the TMDL implementation plan relies on existing permits. A description of the TMDL implementation plan can be found in the proposed Basin Plan amendment, pages 10 through 18.

TMDL Attainment Schedule and Milestones

The discharge of organophosphate pesticides and presence of toxic conditions within waterbodies of the lower Salinas River watershed affect a broad spectrum of beneficial uses and are, therefore, serious water quality problems. As such, implementation should occur at an accelerated pace to achieve the TMDL allocations in the shortest time-frame feasible.

The TMDL attainment date to achieve TMDL allocations for chlorpyrifos and diazinon and the additive toxicity of chlorpyrifos and diazinon is 2025. This date is consistent with the chlorpyrifos and diazinon TMDLs adopted by the Central Coast Water Board in 2011. Current water quality data indicate that the 2011 TMDL allocations are nearly achieved and, in some cases are achieved (e.g., the Salinas Reclamation Canal was removed from the 303(d) List for diazinon during the 2020-2022 California Integrated Report cycle, approved by USEPA on May 11, 2022). The 2025 attainment date to achieve TMDL allocations for chlorpyrifos and diazinon, including additive toxicity, is different than the 2032 date for achieving the load allocations for chlorpyrifos and diazinon in the Lower Salinas River Watershed TMDL that was reestablished via the Agricultural Order in 2021. TMDL allocations and attainment dates must be implemented in a regulatory mechanism such as permit limits and compliance dates, respectively, to be enforceable. If justified, the Board may establish surface receiving water limit compliance dates for chlorpyrifos and diazinon in a future modified Agricultural Order that is different from the TMDL attainment date.

Water quality trends for malathion indicate a significant increase in concentrations in the lower Salinas River watershed from 2006 to 2018, and crop application of malathion has been persistent within the TMDL Project area. In addition, all waterbodies within the lower Salinas River watershed exhibit significant toxicity to the survival of one or more test species. As such, a longer timeframe will be necessary to attain malathion allocations. The TMDL attainment date to achieve TMDL allocations for malathion and the additive toxicity of malathion in the presence of chlorpyrifos and/or diazinon is 2032.

This 2032 TMDL attainment date is consistent with the receiving water limit compliance date set forth in the current General Waste Discharge Requirements for Discharges from Irrigated Lands, Order No. R3-2021-0040 (Agricultural Order) for malathion in non-TMDL areas (see Agricultural Order, Table C-3.5). The Board may establish a compliance date in a modified Agricultural Order that is different from the TMDL attainment date for malathion, including the additive toxicity of malathion in the presence of chlorpyrifos and/or diazinon.

Climate Change

The Central Coast faces the threat and the effects of climate change for the foreseeable and distant future. To proactively prepare and respond, the Central Coast Water Board has launched the Central Coast Water Board's Climate Action Initiative, which identifies how the Central Coast Water Board's work relates to climate change and prioritizes actions that improve water supply resiliency through water conservation and wastewater reuse and recycling; mitigate for and adapt to sea level rise and increased flooding; improve energy efficiency; and reduce greenhouse gas production. The Climate Action Initiative is consistent with the Governor's Executive Order B-30-15 and the State Water Board's Climate Change Resolution No. 2017-0012.

This TMDL Project incorporates irrigation management methods to reduce runoff into streams, reduce the use of water, and restore surface and groundwater resources. Implementation methods that would incorporate riparian protection, vegetated buffers, and wetland treatment systems will increase carbon sequestration and protect sensitive ecosystems and aquatic habitats. Restoring riparian habitat not only protects waterbodies from these pollutants in runoff but also provides shading which serves to mitigate increases in water temperature.

Human Right to Water

California Water Code section 106.3, subdivision (a) states: It is a policy of the State of California "that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitation purposes." On January 26, 2017, the Central Coast Water Board adopted Resolution No. R3-2017-0004⁶ which affirms the realization of the human right to water and the protection of human health as the Central Coast Water Board's top priorities.

This TMDL Project addresses the human right to water by identifying sources of organophosphate pesticides and toxicity and establishing a TMDL implementation plan and schedule to attain water quality standards and improve water quality in the lower Salinas River watershed. Waterbodies in the watershed are designated for aquatic life, recreation, and municipal and domestic water supply beneficial uses. Attaining water quality standards and the TMDL allocations established in this Project for the protection of aquatic life also protects human health by protecting potential sources of drinking water.

⁶ https://www.waterboards.ca.gov/centralcoast/board_decisions/adopted_orders/2017/2017-0004_hrtw_fnl.pdf

Environmental Justice

Environmental Justice principles call for the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income in the development, adoption, implementation, and enforcement of all environmental laws, regulations, and policies that affect every community's natural resources and the places people live, work, play, and learn. The Central Coast Water Board implements regulatory activities and water quality projects in a manner that ensures the fair treatment of all people, including Underrepresented Communities. Underrepresented Communities include but are not limited to Disadvantaged Communities (DACs), Severely Disadvantaged Communities (SDACs), Economically Distressed Areas (EDAs), Tribes, Environmentally Disadvantaged Communities (EnvDACs), and members of Fringe Communities.⁷ Furthermore, the Central Coast Water Board is committed to providing all stakeholders the opportunity to participate in the public process and provide meaningful input to decisions that affect their communities. Staff conduct focused outreach to ensure all interested parties are notified of opportunities to participate in the planning and implementation of this TMDL Project.

Several DACs and SDACs are located within the lower Salinas River watershed and staff recognize that the cost of implementation may be significant and could be a burden to these communities. The TMDL Project Technical Report (see Attachment 2, Section 4.3.3) provides a map showing the location of DACs and SDACs in the lower Salinas River watershed. By identifying DACs and SDACs in the project area, staff and stakeholders will be able to increase and focus outreach and work towards identifying grant funds to reduce the implementation costs.

To engage Tribes in the TMDL Project planning process, staff contacted the California Native American Heritage Commission for a list of tribes with traditional lands or cultural places in Monterey County. Representatives of these tribes were individually notified and invited to request consultation at the start of the public process for this TMDL Project. In addition to individually contacting tribal representatives, staff notified representatives of organizations that assist DACs and SDACs in the lower Salinas River watershed about the Project and solicited their input.

⁷ Disadvantaged Community: a community with an annual median household income that is less than 80% of the statewide annual median household income (Public Resources Code section 80002(e)); Severely Disadvantaged Community: a community with a median household income of less than 60% of the statewide average. (Public Resources Code section 80002(n)); Economically Distressed Area: a municipality with a population of 20,000 persons or less, a rural county, or a reasonably isolated and divisible segment of a larger municipality where the segment of the population is 20,000 persons or less with an annual median household income that is less than 85% of the statewide median household income and with one or more of the following conditions as determined by the department: (1) financial hardship, (2) unemployment rate at least 2% higher than the statewide average, or (3) low population density. (Water Code section 79702(k)); Tribes: federally recognized Indian Tribes and California State Indian Tribes listed on the Native American Heritage Commission's California Tribal Consultation List; EnvDACs: CalEPA designates the top 25 percent scoring census tracts as DACs. Census tracts that score the highest five percent of pollution burden scores but do not have an overall CalEnviroScreen score because of unreliable socioeconomic or health data are also designated as DACs (refer to the CalEnviroScreen 3.0 Mapping Tool or Results Excel Sheet); Fringe Community: communities that do not meet the established DAC, SDAC, and EDA definitions but can show that they score in the top 25 percent of either the Pollution Burden or Population Characteristics score using the CalEnviroScreen 3.0.

California Environmental Quality Act (CEQA)

The CEQA Checklist and Analysis Report (Attachment 3 to this staff report) provides the environmental analysis required by Public Resources Code section 21159. Analysis pursuant to the CEQA Environmental Checklist suggests TMDL Project implementation would have no potentially significant impacts on the environment.

PUBLIC OUTREACH AND INVOLVEMENT

Public outreach and public involvement are an important aspect of the TMDL development process. Our public engagement process included regular TMDL updates, progress reports, scheduled public meetings, and solicitation of public feedback via our stakeholder email subscription list consisting of over 250 stakeholders. These stakeholders represented a wide range of interests, including agricultural interests, local residents, public agencies, environmental groups, local businesses, researchers, local resource professionals, underrepresented communities, tribes, and others. Further detail about our public outreach and involvement activities are documented in Attachment 2 of this staff report.

Public Comments

On March 11, 2022, Central Coast Water Board staff distributed the notice of an opportunity to provide public comment on this proposed Basin Plan amendment and the TMDL Project's draft CEQA Checklist and Analysis Report (see Attachment 4). The 45-day written comment period ended on April 26, 2022. Central Coast Water Board staff did not receive any comments during the public comment period. During the public comment period, staff held a public outreach meeting on April 12, 2022.

In addition, throughout development of this Project, staff conducted public outreach to and held meetings with individual stakeholder groups listed below to review the key components of the TMDL Project, listen to feedback, and to answer questions:

- City of Salinas staff
- County of Monterey staff
- Representatives of Monterey County Farm Bureau
- Representatives from California Department of Fish and Wildlife
- Representatives of the agricultural community
- Central Coast Water Quality Preservation, Inc.
- Tribal representatives within Monterey County
- Underrepresented communities within Monterey County
- Monterey County Agricultural Commission
- Moss Landing Marine Labs
- Monterey Bay National Marine Sanctuary
- California Coastkeeper Alliance
- Other individuals interested in water quality of the lower Salinas River watershed

A notice of public hearing for this proposed action was also issued on April 29th, 2022, via the e-mail subscription service, newspaper publications, and website posting (see Attachment 5).

CONCLUSION

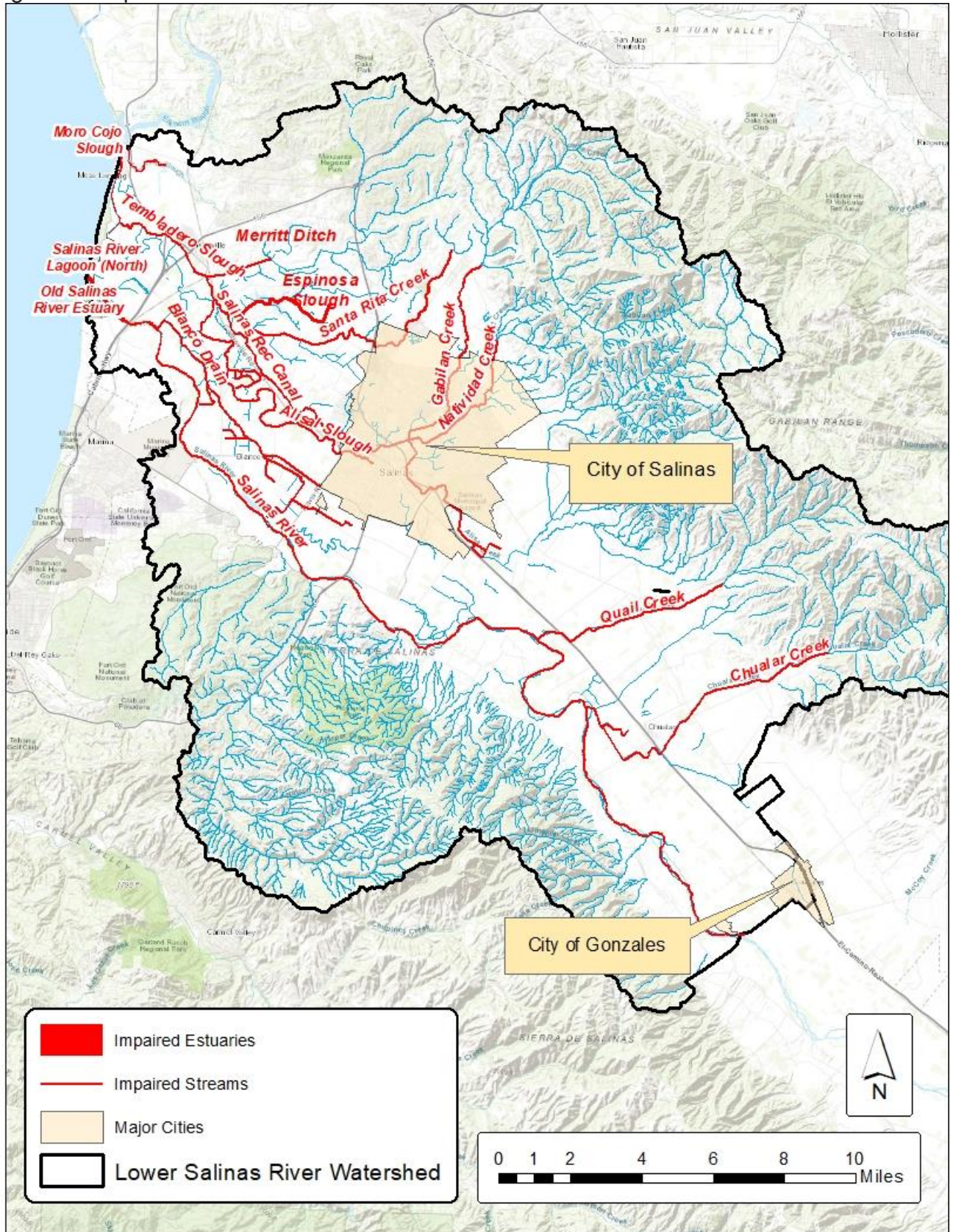
Nearly all surface waters within the lower Salinas River watershed are impaired due to excessive concentrations of one or more organophosphate pesticides and toxicity. This TMDL Project establishes numeric targets to achieve water quality standards protective of beneficial uses, assigns TMDL allocations to responsible parties, and includes an implementation plan to address the sources of organophosphate pesticides and toxicity within in the watershed. This proposed TMDL project, if adopted by the Central Coast Water Board, will supersede the single regulatory action TMDLs for chlorpyrifos and diazinon in the lower Salinas River watershed adopted on May 5, 2011, via Resolution R3-2011-0005 and reestablished on April 21, 2021, via the Agricultural Order.

RECOMMENDATION

Adopt Resolution No. R3-2022-0020 as proposed.

FIGURES

Figure 1. Map of the lower Salinas River watershed.



ATTACHMENTS

Attachment 1: Resolution No. R3-2022-0020 and Basin Plan amendment (Attachment A to the Resolution)

Attachment 2: TMDL Project Technical Report

Attachment 3: CEQA Checklist and Analysis Report

Attachment 4: Notice of Opportunity to Comment

Attachment 5: Notice of Public Hearing