



California Regional Water Quality Control Board Central Valley Region

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TO: Gerald Bowes, Ph.D.
Manager, Cal/EPA Scientific Peer
Review Program
Office of Research, Planning and
Performance
State Water Resources Control
Board

FROM: Ken Landau
Assistant Executive Officer

DATE: 29 October 2009

SIGNATURE:

SUBJECT: REQUEST FOR EXTERNAL PEER REVIEW OF PROPOSED BASIN PLAN
AMENDMENTS TO ADD WATER QUALITY OBJECTIVES FOR CHLOROFORM,
CHLORODIBROMOMETHANE, AND DICHLOROBROMOMETHANE FOR NEW
ALAMO AND ULATIS CREEKS AND PERMIT IMPLEMENTATION PROVISIONS

The Central Valley Regional Water Quality Control Board requests that you initiate the process to identify reviewers to provide external peer review for the proposed amendments per the requirements of Health and Safety Code Section 57004. The proposed Basin Plan Amendments are tentatively scheduled to be considered by the Regional Board in May 2010. The staff report and supporting technical documents are ready for review. We would like peer review to be completed by 15 January 2010 in order to have sufficient time to complete the public participation requirements by May 2010.

The proposed amendments will affect approximately 26 miles of New Alamo and Ulatis Creeks in Solano County. The proposed amendments will add site-specific water quality objectives for chloroform, chlordibromomethane and dichlorobromomethane, three of the four trihalomethanes (THMs). In addition the proposed amendments include permit implementation provisions. Attachment 1 provides a summary of the proposed action.

We recommend that the external peer reviewers have expertise in human health and in performing environmental statistics. Attachment 2 is a listing of the specific scientific issues that we would like the reviewers to address. Attachment 3 contains a list of the persons who have participated in the development of this proposal.

If you have any questions, please contact either Betty Yee at (916) 464-4643 or Holly Grover at (916) 464-4747.

Attachments

cc: Mr. Rik Rasmussen, Division of Water Quality, State Water Resources Control Board,
Sacramento

California Environmental Protection Agency

Attachment 1

Water Quality Objectives for Chloroform, Chlorodibromomethane, and Dichlorobromomethane for Segments of New Alamo and Ulatis Creeks and Permit Implementation Provisions

Summary of Proposed Action

I. Summary

The Central Valley Water Board staff is proposing a basin plan amendment to establish site-specific water quality objectives for chloroform, chlorodibromomethane (DBCM), and dichlorobromomethane (DCBM) for New Alamo Creek, from the confluence with Old Alamo Creek to the confluence with Ulatis Creek, and Ulatis Creek, from confluence with New Alamo Creek to the head of Cache Slough. For these three parameters, the water quality standards are not currently being achieved, and costly treatment upgrades would be required to achieve compliance. The existing criteria that were established by USEPA provide a level of protection that would be consistent with water bodies that provide a continuous source of drinking water to some user or group of users that would essentially drink the water for their entire lives. This level of protection is not necessary for the two creeks mentioned above because there is no record of municipal or domestic use of these waters, and because of flow, hydrology and other characteristics of the creeks, it is unlikely that there will be a future use of these water bodies that is more than just incidental. Therefore, we are proposing new water quality objectives that take into consideration the existing water quality and hydrology of the creeks and the potential limited drinking water use of the creeks. The proposed water quality objectives will protect existing conditions and the municipal and domestic supply (MUN) beneficial uses of these two creeks. In addition, the amendment contains additional provisions that specify permitting and other requirements that will apply to existing and new dischargers to Old Alamo Creek (the upstream water source from New Alamo Creek).

II. Rationale

The City of Vacaville's wastewater effluent from the Easterly Wastewater Treatment Facility¹ discharges to Old Alamo Creek but causes exceedances of the current water quality standards in New Alamo Creek, from the confluence with Old Alamo Creek to the confluence with Ulatis Creek, and Ulatis Creek, from the confluence with New Alamo Creek to the head of Cache Slough (see Figure 1). These two creeks exceed the criteria promulgated by USEPA in 40 CFR Part 131.38 (CTR) for DBCM, and DCBM. While USEPA did not promulgate chloroform criteria, these creeks would also exceed chloroform criteria derived using the same methodology.

Water rights information from the State Water Board and Solano County was reviewed, and a stream survey was conducted. Neither the review nor the survey provided any record of

¹ The City of Vacaville's Easterly Wastewater Treatment Facility discharges to Old Alamo Creek, which is tributary to New Alamo Creek, Ulatis Creek and Cache Slough. Ulatis Creek and Cache Slough are part of the Sacramento-San Joaquin Delta. New Alamo Creek, Ulatis Creek and Cache Slough are designated MUN, which means that these water bodies must be protected for municipal or domestic water supply. Old Alamo Creek is not designated MUN, therefore, its water quality standards do not require protection for municipal or domestic water supply.

municipal or domestic use of these waters (RBI 2007). However, conditions in these waters do not justify removal of the municipal and domestic supply (MUN) beneficial use, and it is possible that in the future there may be some incidental use of water in the creeks for domestic purposes. The EPA promulgated criteria in the CTR to protect at 10^{-6} risk level. Achieving this level of protection would require expensive upgrades at the treatment plant. In these creeks where there is clearly no current documented use and potential future use would be incidental, the CTR criteria would be very over-protective. EPA regulations indicate that lesser risk levels can be adopted by states (down to 10^{-4}) and still protect the MUN beneficial use. Therefore, we are proposing new water quality objectives to replace the current EPA criteria. The new water quality objectives are consistent with EPA's policy on acceptable risk level for municipal use (i.e., between 10^{-6} and 10^{-4} incremental cancer risk level) and that would provide protection for the existing and potential incidental use of water in the creeks for municipal purposes.

When the Board adopts water quality objectives, it also needs to adopt an implementation program to assure that the objectives are met. The Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP) (SWRCB 2005) regulations describe methodology to determine reasonable potential² and to calculate effluent limitations. These existing regulations cover discharges to Old Alamo, New Alamo and Ulatis Creeks. These regulations do not provide any methodology for situations where the water body with applicable water quality standards is separated from the effluent discharge by water bodies with less stringent standards. This is the situation in Old Alamo Creek. Therefore, staff is proposing to establish implementation provisions that account for constituents of concern as they travel from the effluent discharge point (in Old Alamo Creek) to the water body with applicable standards (New Alamo Creek). The proposed implementation program includes provisions that would apply to existing and new facilities that discharge or propose to discharge to Old Alamo Creek.

III. Methodology

Site-specific water quality objectives for New Alamo and Ulatis Creeks need to provide protection for the existing and potential uses of the water for municipal or domestic purposes. In addition, the site-specific objectives need to be consistent with EPA policy.

The USEPA software ProUCL (version 4.00.02) was used to evaluate five years of water quality data to derive the maximum expected concentrations under the current conditions. Further description of the use of the USEPA software is explained in Appendix B of the Staff Report. The incremental cancer risk levels were derived using the equations in the USEPA methodology (USEPA 2000a). This information was used to develop the proposed water quality objective.

The implementation plan proposed to accompany the new water quality objectives includes provisions for insuring that discharges to Old Alamo Creek don't cause exceedances of the new objectives that would apply in New Alamo Creek.

² Reasonable potential is the determination of which priority pollutants require water quality-based effluent limitations.

The methodology for determining reasonable potential and calculating effluent limitations must be consistent with USEPA guidance described in their Technical Support Document (1991) and cannot conflict with the SIP (SWRCB 2005). The proposed implementation program includes methods for determining reasonable potential and for calculating effluent limitations that builds upon existing requirements in the SIP by recognizing the attenuation provided by Old Alamo Creek. This is further described in Attachment 2.

IV. References

Robertson-Bryan, Inc. (RBI) 2007. Use Attainability Analysis for Municipal and Domestic Supply (MUN) Use in Segments of New Alamo Creek and Ulatis Creek, Solano County, California. Prepared for Central Valley Regional Water Quality Control Board, on behalf of City of Vacaville. Elk Grove, CA.

SWRCB (State Water Resources Control Board). 2005. Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP)

US Environmental Protection Agency (USEPA). 1991 (March). Technical Support Document for Water Quality-Based Toxics Control. EPA-505-2-90-001. Office of Water, Washington, D.C.

USEPA. 2000. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule. U.S. Environmental Protection Agency (USEPA). Code of Federal Regulations, Title 40, Part 131, Section 38. In Federal Register: May 18, 2000 (Volume 65, No. 97), Rules and Regulations, pp. 31681 31719.

USEPA. 2000a (October). Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. Office of Water. Washington, D.C.

USEPA. 2007 (April). Statistical Software ProUCL 4.0 for Environmental Applications for Data Sets with and without Nondetect Observations. Technical Support Center. Atlanta, GA. Version 4.00.02. Available at:
<http://www.epa.gov/esd/tsc/software.htm>

Attachment 2

Water Quality Objectives for Chloroform, Chlorodibromomethane, and Dichlorobromomethane for Segments of New Alamo and Ulatis Creeks and Permit Implementation Provisions

Description of Scientific Issues to be addressed by Peer Reviewers

The statute mandate for external peer review (Health and Safety Code Section 57004) states that the reviewer's responsibility is to determine whether the scientific portion of the proposed rule is based upon sound scientific knowledge, methods, and practices.

We request that you make this determination for each of the following issues that constitute the scientific portion of the proposed regulatory action. An explanatory statement is provided for each issue to focus the review.

Peer review is required for elements that are not based on previously peer reviewed science. The USEPA guidance (USEPA 1991 and USEPA 2000a) and the state policy Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP) (SWRCB 2005) are previously peer reviewed science. Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff has identified three specific topics for which staff seeks scientific peer review comment on the proposed Basin Plan amendments. The three topics are stated below, followed by additional information to provide initial context for the reviewer. Full context will be obtained by the reviewer by reading the Staff Report and its supporting documentation.

1. *The proposed site-specific objectives provide adequate protection of human health.*

The following proposed water quality objectives are intended to provide adequate protection of potential future drinking water use from the lower segment of New Alamo Creek (from the confluence with Old Alamo Creek to the confluence with Ulatis Creek) and the lower segment of Ulatis Creek (from the confluence with New Alamo Creek to the confluence with Cache Slough):

- DBCM – 4.9 µg/L,
- DCBM – 15.5 µg/L, and
- Chloroform – 45.5 µg/L.

The proposed site-specific water quality objectives limit the maximum trihalomethane (THM) levels in the segment waters to the maximum historical levels observed at the head of the New Alamo Creek segment.

The proposed site-specific objectives for DBCM, DCBM, and chloroform are set equal to the upper end of the concentration distributions for these same constituents derived from historical monitoring at the terminus of Old Alamo Creek (immediately prior to its confluence with New Alamo Creek, at the head of the segments). The concentration distributions were statistically characterized using USEPA software (2007) and site data collected from September 2002 to August 2007.

The incremental cancer risk levels for the proposed site-specific water quality objectives were determined using USEPA Methodology (2000a). The USEPA provides guidance to protect human health (USEPA 2000a), as represented by the MUN beneficial use (40 CFR 131.38), that allows a range in risk level from 10^{-6} to 10^{-4} for human health criteria, as long as the most highly exposed population groups do not exceed a 10^{-4} risk level. This methodology assumes consumption of 2 L/day of water and up to 17.5 g/day of fish/shellfish collected from the segments for a 70-year lifetime. However, no municipal and domestic use of segment waters has occurred in the past, is currently occurring, or is expected to occur in the future (RBI 2007c). Nevertheless, it is important to maintain the MUN beneficial use for the segments in order to maintain water quality in the lower New Alamo Creek and Ulatis Creek segments at a level sufficient to protect potential future transient and incidental drinking water use, should it ever occur. Therefore, the risk factors derived for the site-specific objectives using this USEPA methodology (as shown in Appendix B, Table B-5 of the Draft Staff Report) demonstrate that the proposed site-specific objectives would be adequately protective of future MUN use, including the consumption of 2 L/day of water and up to 17.5 g/day of fish/shellfish from the segments for a 70-year lifetime. In reality, any potential future drinking water use, should it occur, is anticipated to be transient and incidental in nature. The exposure involved with a transient and incidental use would be substantially less than the USEPA 2000a Methodology default exposure values. As such, any transient and incidental drinking water use of segment waters, under the proposed site-specific objectives, would result in substantially lower risk levels than those shown in Appendix B, which were derived using the higher default EPA exposure levels cited above.

2. *The approach to determining "reasonable potential" would be appropriate and effective in determining whether point source discharges into Old Alamo Creek (a water body for which MUN is not a designated beneficial use) have reasonable potential to cause or contribute to an excursion above the site-specific THM objectives within the segments.*

Staff believe that the implementation provisions for this Basin Plan amendment to determine the need for water quality-based effluent limitations (i.e., provisions for assessing "reasonable potential") are consistent with federal regulations and guidance (USEPA 1991) and the SIP (SWRCB 2005).

Federal regulations (40 CFR 122.44(d)(1)(ii)) set forth the provisions for determining whether a discharge has a reasonable potential to cause or contribute to an excursion above a water quality standard. It states: "When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water." USEPA has guidance (USEPA 1991) on how to comply with these federal regulations.

The SIP specifies that in order to determine if a discharge requires a water quality-based effluent limitation, the maximum effluent concentration is compared to the applicable water

quality criteria for the receiving water. The SIP also includes directions to review other available information to determine if a water quality-based effluent limitation is required.

These regulations do not provide any methodology for situations where the water body with applicable water quality standards is separated from the effluent discharge by a water body with less stringent standards (i.e., Old Alamo Creek in this case). However, since both regulations require comparison of discharge quality to the applicable water quality criteria of the receiving water, the proposed Basin Plan amendment will require determination of whether there is a reasonable potential to cause or contribute to an excursion above one of the site-specific THM objectives applicable to segment waters.

A step-wise procedure (see Section 4.2.1 and 5 of the Draft Staff Report) is the proposed basin plan amendment language that would apply to any point-source discharge into Old Alamo Creek, which itself lacks a MUN use designation, but flows into New Alamo Creek at the head of the segments. In short, the "reasonable potential" to cause an excursion above the site-specific objectives in lower New Alamo and Ulatis Creeks from any point source discharge to Old Alamo Creek (tributary to New Alamo) is determined by evaluating both the maximum effluent concentration and the co-occurring concentration at the terminus of Old Alamo Creek to see if both concentrations exceed the site-specific objectives.

3. *The "attenuation factor" as proposed, is a technically sound approach to derive the effluent limits, which apply to discharges into Old Alamo Creek, from the site-specific objectives applicable to the lower segments of New Alamo Creek and Ulatis Creek.*

The implementation provisions proposed for calculating water quality-based effluent limitations are consistent with federal regulations and guidance (USEPA 1991) and the SIP (SWRCB 2005).

Federal regulations (40 CFR 122.45) require the development of effluent limitations and that these limitations be expressed, unless impracticable, as both average monthly and maximum daily values for all discharges other than POTWs and as average weekly and average monthly limits for POTWs. However, the federal guidance (USEPA 1991) recommends that for POTWs, in lieu of establishing an average weekly limit, establish maximum daily limits for toxic pollutants and pollutant parameters in water quality permitting.

The SIP (SWRCB 2005) prescribes the methodology for deriving average monthly and maximum daily effluent limitations for dischargers.

These regulations and guidance do not provide methodology for situations where the water body with applicable MUN water quality standards is separated from the effluent discharge by a water body that lacks a MUN use (i.e., Old Alamo Creek in this case). To account for the presence of Old Alamo Creek, which separates the effluent discharge from the City of Vacaville's Easterly Wastewater Treatment Plant and possibly future point-source discharges from the initial downstream water body segment (lower New Alamo Creek) with applicable water quality standards, the proposed Basin Plan amendment will incorporate an attenuation factor into the equations from the SIP. See Section 4.2.1 and 5 of the Draft Staff Report.

The Attenuation Factor accounts for the reduction in THM concentrations between the point-source discharge into Old Alamo Creek and the terminus of Old Alamo Creek where it flows into New Alamo Creek, at the head of the segments. The Attenuation Factor used in the calculation of the effluent limitations for the point source dischargers will be the median of the individual sample attenuation values derived from all representative historical data for the 1 November through 31 March period of each year (i.e., the non-irrigation season) in order to account for volatilization losses and reduction in constituent concentration due to dilution separately (RBI 2009). Because Old Alamo Creek has been disconnected from its watershed, it conveys little water other than Easterly Wastewater Treatment Plant effluent downstream of the Easterly plant during the November through March period of the year. Conversely, during the April through October agricultural irrigation season, irrigation water and agricultural return flows are conveyed down the lower mile of Old Alamo Creek, in addition to Easterly Wastewater Treatment Plant effluent.

For each regulated discharge into Old Alamo Creek, individual sample attenuation values are calculated as the effluent constituent concentration measured on a given day divided by the in-stream constituent concentration at the terminus of Old Alamo Creek measured the same day. Use of the median of the individual sample attenuation values (rather than the mean) results in less bias from atypically high or low individual sample attenuation values measured over the years. The proposed implementation program will require coordinated monitoring of: 1) the individual discharger's effluent THM concentrations, and 2) THM concentrations at the terminus of Old Alamo Creek. The period from 1 November through 31 March each year is during the non-irrigation season and represents the period of the year when reduction of the THM constituents between the discharge location and the segments to which the new objectives apply is due almost entirely to volatilization and not to dilution (RBI 2009). This will allow the Board to address dilution in the manner prescribed by the SIP (SWRCB 2005). For an example of constituent-specific historical attenuation values and example effluent limitations calculations, data from the Easterly Wastewater Treatment Plant is provided in Appendix C of the Draft Staff Report.

The Big Picture

Reviewers are not limited to addressing only the scientific issues presented above, and are asked to contemplate the broader perspective.

- (a) In reading the staff technical reports and proposed implementation language, are there any additional scientific issues that are part of the scientific basis of the proposed rules not described above? If so, please comment with respect to the statute language given above.
- (b) Taken as a whole, is the scientific portion of the proposed rule based upon sound scientific knowledge, methods, and practices?

Reviewers should also note that some proposed actions may rely significantly on professional judgment where available scientific data are not as extensive as desired to support the statute requirement for absolute scientific rigor. In these situations, the proposed course of action is favored over no action.

The preceding guidance will ensure that reviewers have an opportunity to comment on all aspects of the scientific basis of the proposed Board action. At the same time, reviewers also should recognize that the Board has a legal obligation to consider and respond to all feedback on the scientific portions of the proposed rule. Because of this obligation, reviewers are encouraged to focus feedback on the scientific issues that are relevant to the central regulatory elements being proposed.

References

Code of Federal Regulations, Title 40, Part 122, Section 44(d)(1)(ii) and Section 45

RBI. 2007c. Use Attainability Analysis for Municipal and Domestic Supply (MUN) Use in Segments of New Alamo Creek and Ulatis Creek, Solano County, California. Prepared for Central Valley Regional Water Quality Control Board, on behalf of City of Vacaville. Elk Grove, CA.

RBI. 2009. Derivation of Human Health Criteria for Trihalomethane Compounds for Segments of New Alamo Creek and Ulatis Creek, Solano County, California. Prepared for Central Valley Regional Water Quality Control Board, on behalf of City of Vacaville. Elk Grove, CA.

SWRCB (State Water Resources Control Board). 2005. Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP)

US Environmental Protection Agency (USEPA). 1991 (March). Technical Support Document for Water Quality-Based Toxics Control. EPA-505-2-90-001. Office of Water, Washington, D.C.

USEPA. 2000. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule. U.S. Environmental Protection Agency (USEPA). Code of Federal Regulations, Title 40, Part 131, Section 38. In Federal Register: May 18, 2000 (Volume 65, No. 97), Rules and Regulations, pp. 31681 31719.

USEPA. 2000a (October). Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA-822-B-00-004. Office of Water. Washington, D.C.

USEPA. 2007 (April). Statistical Software ProUCL 4.0 for Environmental Applications for Data Sets with and without Nondetect Observations. Technical Support Center. Atlanta, GA. Version 4.00.02. Available at:
<http://www.epa.gov/esd/tsc/software.htm>

Attachment 3

**Water Quality Objectives for Chloroform, Chlorodibromomethane, and
Dichlorobromomethane for New Alamo and Ulatis Creeks and Permit Implementation
Provisions**

Individual Involved in Development of this Basin Plan Amendment

Michael Bryan, Robertson-Bryan, Inc.
Jacque McCall, City of Vacaville
David Tompkins, City of Vacaville
Mitchell Goode, SWRCB
Tom Kimball, SWRCB
Rik Rasmussen, SWRCB
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Philip Woods, USEPA
Nancy Yoshikawa, USEPA

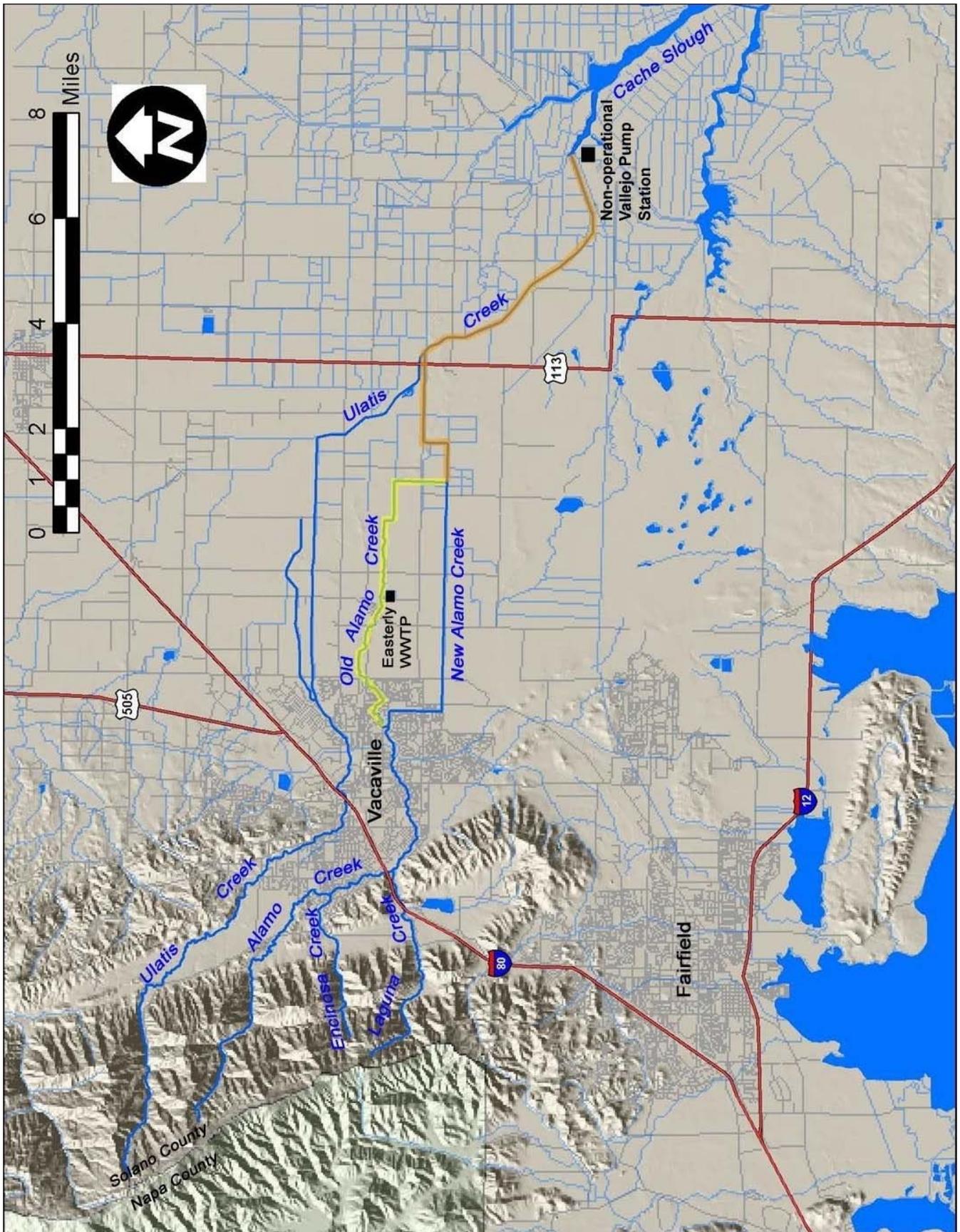


Figure 1. Project area map of Easterly WWTP, New Alamo Creek and Ulatis Creek. (RBI 2009). The proposed amendments would apply to the orange-highlighted segments.