

STATE OF CALIFORNIA  
REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF MAY 30-31, 2013

Prepared April, 2013

ITEM NUMBER: 10

SUBJECT: Adopting Total Maximum Daily Loads for Chloride and Sodium for the Jalama Creek Subwatershed

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THIS ACTION: Adopt Resolution No. R3-2013-0030

**SUMMARY**

Staff recommends the Central Coast Water Board approve a resolution (Attachment 1 to this Staff Report) that establishes Total Maximum Daily Loads (TMDLs) for chloride and sodium in the Jalama Creek subwatershed and an associated implementation strategy that proposes the development of site-specific water quality objectives for chloride and sodium. A concise tabular summary of the proposed TMDLs and implementation strategy is presented in Appendix A, located on page 9 of this staff report.

Simply put, TMDLs are strategies or plans to address impaired waters identified on the Clean Water Act Section 303(d) list. The goals for establishing these TMDLs are to 1) calculate the pollutant loading capacity of Jalama Creek in accordance with Clean Water Act requirements; 2) conduct a limited review of the appropriateness of the water quality assessment criteria used for Jalama Creek; 3) recommend a strategy to correct the inappropriate water quality assessment criteria, which do not account for local natural background conditions; and 4) identify and protect existing water quality conditions, consistent with state and federal anti-degradation requirements<sup>1,2</sup>.

The Jalama Creek subwatershed drains a 24-square-mile, sparsely populated, rural area of coastal Santa Barbara County. A regional map of the Jalama Creek subwatershed is presented in Figure 1 on page 8. According to U.S. Census Bureau data there are fewer than 20 people and only a few housing units within the subwatershed. There are no point-source discharges and no irrigated cropland. The subwatershed is composed primarily of native vegetation; human activities in the subwatershed are mainly limited to ranching operations in rangeland reaches of the subwatershed.

Jalama Creek was listed on the 2010 Clean Water Act Section 303(d) list on the basis of not meeting University of California Cooperative Extension recommended general *guidelines* for chloride and sodium in agricultural irrigation supply water applied via sprinklers<sup>3</sup>; note that these

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<sup>1</sup> State and federal anti-degradation policies require that where existing water quality is *better* than the quality of water established as objectives, such existing water quality shall be maintained. In Jalama Creek, designated drinking water supply, aquatic habitat, and existing agricultural supply beneficial uses are being supported on the basis of chloride and sodium water quality data. Consequently, future degradation of existing chloride and sodium water quality is not allowed unless consistent with provisions of state and federal anti-degradation policies.

<sup>2</sup> One of the Central Coast Water Board's top priorities is *preventing* degradation of existing high quality aquatic habitat (see Staff Report, Agenda Item 3 for Regular Meeting of July 11, 2012).

<sup>3</sup> These non-regulatory guideline values are a susceptibility range for plant foliar injury resulting from foliar absorption in sensitive crops due to sprinkler irrigation. With drip and furrow irrigation, chloride and sodium injury do not generally occur in vegetable and row crops unless salinity in irrigation water is severe. Under sprinkler irrigation, foliar injury may occur to wetted leaves of susceptible plants such as pepper, tomato and potatoes (see *University of California-Davis, Farm Water Quality Planning Reference Sheet 9.10, ANR Publication 8066*).

guidelines are not regulatory standards, and are simply used as regional screening assessment thresholds for the 303(d) impaired waters listing process.

Staff finds that the exceedances of chloride and sodium 303(d) assessment guidelines are due to natural conditions. Geologic conditions in the subwatershed result in naturally elevated levels of chloride and sodium, and the nexus of groundwaters, surface water, and geology is resulting in elevated salt concentrations in creek water. Consequently, staff recommends a revision of the chloride and sodium guidelines currently found in the Basin Plan, applicable to Jalama Creek. Additionally, staff recommends closer scrutiny when considering the addition of new 303(d) listings for chloride and sodium in surface waters which may be influenced by the geology in the vicinity of the Jalama Creek subwatershed.

Staff determined that drinking water supply, groundwater recharge, aquatic habitat, and existing agricultural supply (livestock watering) beneficial uses are currently being supported in Jalama Creek on the basis of numeric criteria for chloride and sodium. Therefore, the marginally elevated levels of chloride and sodium in the creek do not constitute a water quality problem or threat to existing beneficial uses.

TMDLs are often adopted through basin plan amendments when the solution to impairment would require multiple actions of regional water boards; for example, actions that affect multiple regulatory measures or regulatory permits. For this TMDL, adoption through a basin plan amendment is not necessary. Staff recommends Central Coast Water Board's approval of the resolution associated with this agenda item. State policy considers this type of approach, when warranted, to be a matter of efficiency and resource allocation as it reduces regulatory and administrative redundancy<sup>4</sup>.

Staff developed the technical basis for the TMDLs and associated implementation strategy, which is provided in the Final Project Report (Attachment 2 to this staff report). The Final Project Report is provided at the Central Coast Water Board's website:

[http://www.waterboards.ca.gov/centralcoast/water\\_issues/programs/tmdl/docs/jalama\\_creek/index.shtml](http://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/jalama_creek/index.shtml)

## DISCUSSION

### Project Development for TMDLs

Staff developed the TMDLs using water quality data from the Water Board's Central Coast Ambient Monitoring Program (CCAMP). Staff also used land use data, hydrologic data, geologic data, and groundwater data from the U.S. Geological Survey, the National Hydrography Dataset, the California Department of Conservation, as well as from other agency and scientific sources.

### Numeric Targets

Numeric targets are water quality targets developed and used to ascertain when and where water quality objectives are achieved, and hence, when beneficial uses are protected.

#### Chloride Target for Protection of MUN-GWR beneficial uses:

The purpose of this target is to implement the Basin Plan's narrative taste and odor general water quality objective for drinking water supply. The U.S. Environmental Protection Agency and the California Department of Public Health have established a recommended secondary maximum contaminant level (secondary MCL) for chloride in drinking water of 250 mg/L. Therefore, the

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<sup>4</sup> *Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options*. State Water Resources Control Board, adopted by Resolution 2005-0050.

numeric target for chloride, which demonstrates whether or not the MUN (drinking water supply) and GWR (groundwater recharge) designated beneficial uses are being supported, is as follows:

- *The controllable discharge of wastes shall not cause concentrations of chloride to exceed 250 mg/L in receiving waters.*

**Based on available water quality data, chloride concentrations in Jalama Creek are easily achieving this numeric target under all flow and seasonal conditions and therefore MUN and GWR designated beneficial uses of the creek are being supported.** It should be noted that State and federal anti-degradation policies require that existing chloride water quality which is currently supporting MUN and GWR be maintained, and that future degradation of existing water quality is not allowed unless consistent with provisions of the state and federal anti-degradation policies<sup>5</sup>.

*Chloride Target for Protection of WARM, SPWN beneficial uses:*

The purpose of this target is to implement the Basin Plan's narrative toxicity general water quality objective and to ensure support of designated aquatic habitat beneficial uses in Jalama Creek. The U.S. Environmental Protection Agency has established a recommended acute toxicity threshold for chloride in ambient fresh waters of 860 mg/L. Therefore, this numeric target for chloride, which demonstrates whether or not the WARM and SPWN designated beneficial uses are being supported, is as follows:

- *The controllable discharge of wastes shall not cause concentrations of chloride to exceed 860 mg/L in receiving waters.*

**Based on available water quality data, chloride concentrations in Jalama Creek are easily achieving this numeric target under all flow and seasonal conditions and therefore aquatic habitat designated beneficial uses of the creek are being supported.** It should be noted that State and federal anti-degradation policies require that existing chloride water quality which is currently supporting aquatic habitat be maintained, and that future lowering of existing water quality is not allowed unless consistent with provisions of the state and federal anti-degradation policies<sup>6</sup>.

*Chloride and Sodium Targets for Protection of AGR beneficial uses:*

The Basin Plan numeric water quality guidelines used in the 2010 303(d) assessment for chloride and sodium in irrigation water applied via sprinklers are 106 mg/L and 69 mg/L respectively. These values are based on University of California Agricultural Extension Service guideline values for chloride and sodium in irrigation water, and it should be noted that these values may not necessarily be appropriate due to local conditions or special conditions of crop, soil, and method of irrigation. For example, almond, apricot, and citrus are relatively susceptible to foliar injury from chloride in sprinkler irrigation water whereas cauliflower, sunflower, and sugar beet are relatively tolerant of chloride in sprinkler irrigation water<sup>7</sup>.

Note that while the aforementioned numeric water quality concentrations for chloride and sodium in irrigation water are recommended general guidelines, because they are published in the Central Coastal Basin Plan the U.S Environmental Protection Agency (USEPA) considers these values to be water quality objectives for purposes of TMDL calculation<sup>8</sup>. This is because TMDLs must be

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<sup>5</sup> State Water Resources Control Board and appellate court decisions indicate that water can be considered high quality for purposes of the anti-degradation policy on a constituent-by-constituent basis. Therefore, water can be of high quality under the anti-degradation policy for some constituents or beneficial uses, but not for others (see *Court of Appeal of the State of California, Third Appellate District, Appeal Case C066410, Acociacion de Gente Unida, etc. et al. v. Central Valley Regional Water Quality Control Board*).

<sup>6</sup> *Ibid*

<sup>7</sup> Agricultural Assessment and Management Manual. K.K. Tanji (ed.). American Society of Civil Engineers, New York.

<sup>8</sup> Letter from USEPA Region IX to Central Coast Water Board staff dated March 18, 2013.

consistent with current water quality criteria found in the Central Coastal Basin Plan. Therefore, the proposed TMDL numeric targets for chloride and sodium demonstrating whether or not the AGR designated beneficial use for irrigation supply are being supported are as follows:

- *The controllable discharge of wastes shall not cause concentrations of chloride to exceed 106 mg/l in receiving waters.*
- *The controllable discharge of wastes shall not cause concentrations of sodium to exceed 69 mg/l in receiving waters.*

Based on numeric water quality criteria outlined above and those presented within the TMDL project report (attachment 2 of the Staff Report), Table 1 presents a tabular summary of numeric water quality criteria, recommended general guidelines and associated identified water body impairment status within the TMDL project area.

Table 1. Status summary of Jalama Creek designated beneficial uses that could potentially be impacted by chloride or sodium.

| Designated Beneficial Use  | Water Quality Objective or Recommended Numeric Level <sup>A</sup>                                 | Exceeding Water Quality Criteria or Non-regulatory Recommended Level?   | Is Beneficial Use Being Supported?   |
|--|---|---|--|
| MUN & GWR<br>(drinking water supply & groundwater recharge)                        | Taste and Odor Narrative Objective<br>250 mg/L Chloride   | No  | Yes  |
| AGR<br>(irrigation sprinkler water supply for chloride and sodium sensitive crops) | <106 mg/L Chloride = "no problem"<br><69 mg/L Sodium = "no problem"                               | Yes <sup>A</sup><br><i>depending on situation specific condition of crop, soils, and method of irrigation</i> | No <sup>B</sup><br><i>on the basis of the University of California Agricultural Extension Service guideline values</i> |
| AGR<br>(irrigation water supply for chloride and sodium tolerant crops)            | 106 to 700 mg/L Chloride<br>69 to 460 mg/L Sodium<br>4.0 to 10.0 Adjusted SAR Sodium <sup>C</sup> | No  | Yes  |
| AGR<br>(stock watering, support of vegetation for range grazing)                   | None  | No  | Yes  |
| WARM, SPWN<br>(aquatic habitat)  | Toxicity Narrative Objective<br>860 mg/L Chloride   | No  | Yes  |

<sup>A</sup> It should be noted that the University of California Agricultural Extension Service guideline values for chloride and sodium are flexible, and may not necessarily be appropriate due to local conditions or special conditions of crop, soil, and method of irrigation. In cases where local natural conditions are causing the non-attainment of the University of California Agricultural Extension Service guideline values, it may be necessary to develop site-specific water quality objectives for these constituents.

<sup>B</sup> This determination is made on the basis of the University of California Agricultural Extension Service guideline values published in the Basin Plan. It is important to note that these guidelines have limitations in actual practice; in many instances a water may be wholly unsuitable for irrigation under certain conditions of use and yet be completely satisfactory under other conditions depending on soil permeability, temperature, humidity, rainfall, and other contributing factors. As such, the designated AGR beneficial use of Jalama Creek may in fact be supportable on the basis of site-specific conditions and site-specific water quality objectives which may be developed for chloride and sodium pursuant to this TMDL.

<sup>C</sup> SAR can be reduced if necessary by adding gypsum.

## Source Analysis

There is no plausible evidence of human impacts and activities that could cause or contribute to observed elevated chloride and sodium levels in Jalama Creek. Indeed, multiple lines of evidence are developed in the TMDL project report (attachment 2 to the staff report) which credibly demonstrates non-controllable natural sources are the cause of elevated levels of chloride and sodium in Jalama

Creek at monitoring site 315JAL. Natural sources that cause or contribute to elevated levels of chloride and sodium in Jalama Creek include local geology, groundwaters, saline springs, and geothermal waters.

### TMDLs and Allocations

#### TMDLs:

The TMDL represents the loading capacity of a waterbody—the amount of a pollutant that the waterbody can assimilate and still support beneficial uses. The TMDL is the sum of allocations for nonpoint and point sources and any allocations for a margin of safety.

The TMDLs for chloride and sodium for Jalama Creek are as follows:

*Chloride TMDL: 303 pounds per day,  
and*

*The controllable discharge of wastes shall not cause concentrations of chloride to exceed 106 mg/L in receiving waters.*

*Sodium TMDL: 197 pounds per day,  
and*

*The controllable discharge of wastes shall not cause concentrations of sodium to exceed 69 mg/L in receiving waters.*

#### Allocations:

Waste load allocations are pollutant allocations to point sources. There are no point sources in the Jalama Creek subwatershed so the waste load allocation component of the TMDL is set at zero. Load allocations are pollutant allocations to non-point sources. The identified source of elevated chloride and sodium in Jalama Creek is naturally occurring and non-controllable, so the load allocation is assigned to natural sources. Therefore, the existing loading capacity (TMDL) of Jalama Creek is set equal to the load allocation. Table 2 and Table 3 present tabular summaries of the chloride and sodium TMDL allocations.

Table 2. Chloride allocations.

| <b><u>CHLORIDE WASTE LOAD ALLOCATIONS</u></b> <sup>A</sup> |                           |  |  |
|--|---------------------------|--|--|
| <b><u>Waterbody</u></b>                                    | <b><u>WBID</u></b>        | <b><u>Party Responsible (Source)</u></b>                                   | <b><u>Receiving Water Allocation for Chloride (pounds per day)</u></b> |
| Jalama Creek <sup>a</sup>                                  | CAR3151005119990304115034 | NONE   | 0  |
| <b><u>CHLORIDE LOAD ALLOCATIONS</u></b> <sup>A</sup>       |                           |  |  |
| <b><u>Waterbody</u></b>                                    | <b><u>WBID</u></b>        | <b><u>Responsible Party (Source)</u></b>                                   | <b><u>Receiving Water Allocation for Chloride (pounds per day)</u></b> |
| Jalama Creek <sup>a</sup>                                  | CAR3151005119990304115034 | Natural Sources<br>(no responsible parties -<br>not subject to regulation) | 303  |

<sup>A</sup> federal and state anti-degradation requirements apply to all waste load and load allocations.

Table 3. Sodium allocations.

| <b><u>SODIUM WASTE LOAD ALLOCATIONS</u></b> <sup>A</sup> |                           |  |  |
|--|---------------------------|--|--|
| <b><u>Waterbody</u></b>                                  | <b><u>WBID</u></b>        | <b><u>Party Responsible (Source)</u></b>                                   | <b><u>Receiving Water Allocation for Sodium (pounds per day)</u></b> |
| Jalama Creek <sup>a</sup>                                | CAR3151005119990304115034 | NONE   | 0  |
| <b><u>SODIUM LOAD ALLOCATIONS</u></b> <sup>A</sup>       |                           |  |  |
| <b><u>Waterbody</u></b>                                  | <b><u>WBID</u></b>        | <b><u>Responsible Party (Source)</u></b>                                   | <b><u>Receiving Water Allocation for Sodium (pounds per day)</u></b> |
| Jalama Creek <sup>a</sup>                                | CAR3151005119990304115034 | Natural Sources<br>(no responsible parties -<br>not subject to regulation) | 197  |

<sup>A</sup> federal and state anti-degradation requirements apply to all waste load and load allocations.

### Interim Numeric Targets

It should be noted that the allocations presented above—which are based on numeric water quality targets of 106 and 69 mg/L for chloride and sodium respectively—are **unachievable due to non-controllable local natural and geologic conditions**, as documented in the TMDL project report (attachment 2 of the Staff Report).

Therefore, the TMDL implementation actions staff proposes contemplate development of site-specific numeric water quality objectives appropriate for natural background conditions.

In order to address the interim discrepancy between the proposed TMDL allocations (as shown previously in Table 2 and Table 3) and the natural levels of chloride and sodium in Jalama Creek, USEPA recommends setting interim numeric water quality numeric targets that are reflective of local natural conditions in the creek<sup>9</sup>. Development of these interim water quality numeric targets are documented in the TMDL project report (attachment 2 of the staff report), and are 185 mg/L and 120 mg/L for chloride and sodium, respectively. **It should be emphasized that these proposed interim numeric targets for chloride and sodium are already being attained on the basis of natural background loading to Jalama Creek.** Therefore, current attainment of these interim numeric targets serves as an interim water quality benchmark pending future development of final site specific numeric water quality criteria appropriate for natural background conditions.

### Implementation Strategy: Proposed Actions to Correct the 303(d)-Listed Impairments

Staff proposes a revision of the guidelines described in the Basin Plan for chloride and sodium applicable to Jalama Creek. The revision could be development and implementation of site-specific water quality objectives (SSOs) for Jalama Creek for chloride and sodium based on the assessment that exceedances are naturally occurring. This effort will require a basin plan amendment subject to Regional Board, State Board, and USEPA approval.

### Time Schedule for Development of SSOs

Amending chloride and sodium numeric water quality guidelines applicable to Jalama Creek will require development of a basin plan amendment, with Central Coast Water Board, State Board, and USEPA approvals, and considerable expenditure of staff resources. There are no permit

<sup>9</sup> Letter from USEPA Region IX TMDL liaison to Central Coast Water Board staff, dated March 18, 2013.

effluent limitations for chloride or sodium based on the existing irrigation water quality guidelines regulating discharges in the Jalama Creek subwatershed, and existing chloride and sodium water quality is not negatively impacting current beneficial uses of surface waters in the watershed. Therefore, there is no immediate urgency to develop site-specific objectives or revised guidelines for chloride and sodium for the Jalama Creek subwatershed. Staff does, however, recommend a future basin plan amendment to address the issue. Staff will prioritize this future effort against competing threats to water quality. Staff anticipates a basin plan amendment to address the issue could be proposed within ten years, or 2023.

### **ANTI-DEGRADATION**

These TMLDs are consistent with the provisions of State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" and 40 CFR 131.12. The adoption of the proposed TMDLs and TMDL implementation strategy will not de-designate or limit beneficial use designations, will not relax any water quality standard, and will not result in lowering of water quality; therefore, state and federal anti-degradation analyses are not required

### **PUBLIC INVOLVEMENT**

Staff conducted stakeholder outreach efforts during TMDL development. Staff conducted a public workshop in Gaviota on November 16, 2012, and staff engaged with stakeholders during the development of the TMDL through informal contacts such as email and telephone. Individuals and entities staff engaged during the public workshop or contacted during TMDL development included representatives of the following:

- Cojo-Jalama Ranch
- Butterbean Studios Farm
- Vandenberg Air Force Base – Water Resources Program
- University of California Cooperative Extension
- Santa Barbara County Parks
- Cachuma Resource Conservation District
- Santa Barbara County Cattlemen's Association
- Gaviota Coast Conservancy

Information provided by landowners and land operators in the Jalama Creek subwatershed comported with staff's source analysis: namely, that there are very limited anthropogenic impacts in the subwatershed; human activities are mostly limited to rangeland grazing of cattle and very small amounts of dryland farming. Stakeholders familiar with the subwatershed also confirmed the presence of sulfur springs, thereby providing visual confirmation consistent with staff's source assessment pertaining to natural conditions, saline springs, and saline geothermal waters which cause or contribute elevated levels of chloride and sodium in surface waters of Jalama Creek.

The staff report, resolution, and technical project reports were made available for a 35-day public comment commencing on February 22, 2013. Water Board staff solicited public comment from a range of stakeholders including local land owners and land operators, agricultural representatives, environmental representatives, resource professionals, and public agencies.

One public comment letter was received from:

1. Ms. Janet Parrish, TMDL Liaison, U.S. Environmental Protection Agency (USEPA), Region IX, San Francisco, in a letter dated March 18, 2013.



The comment letter from USEPA recommended minor administrative changes to the TMDL project. Staff made the administrative changes as recommended by USEPA. Ms. Parrish also stated USEPA’s support for the proposed TMDL implementation strategy as well as for the goal of identifying and protecting existing water quality conditions, consistent with Clean Water Act anti-degradation requirements.

**RECOMMENDATION**

Adopt Resolution No. R3-2013-0030.

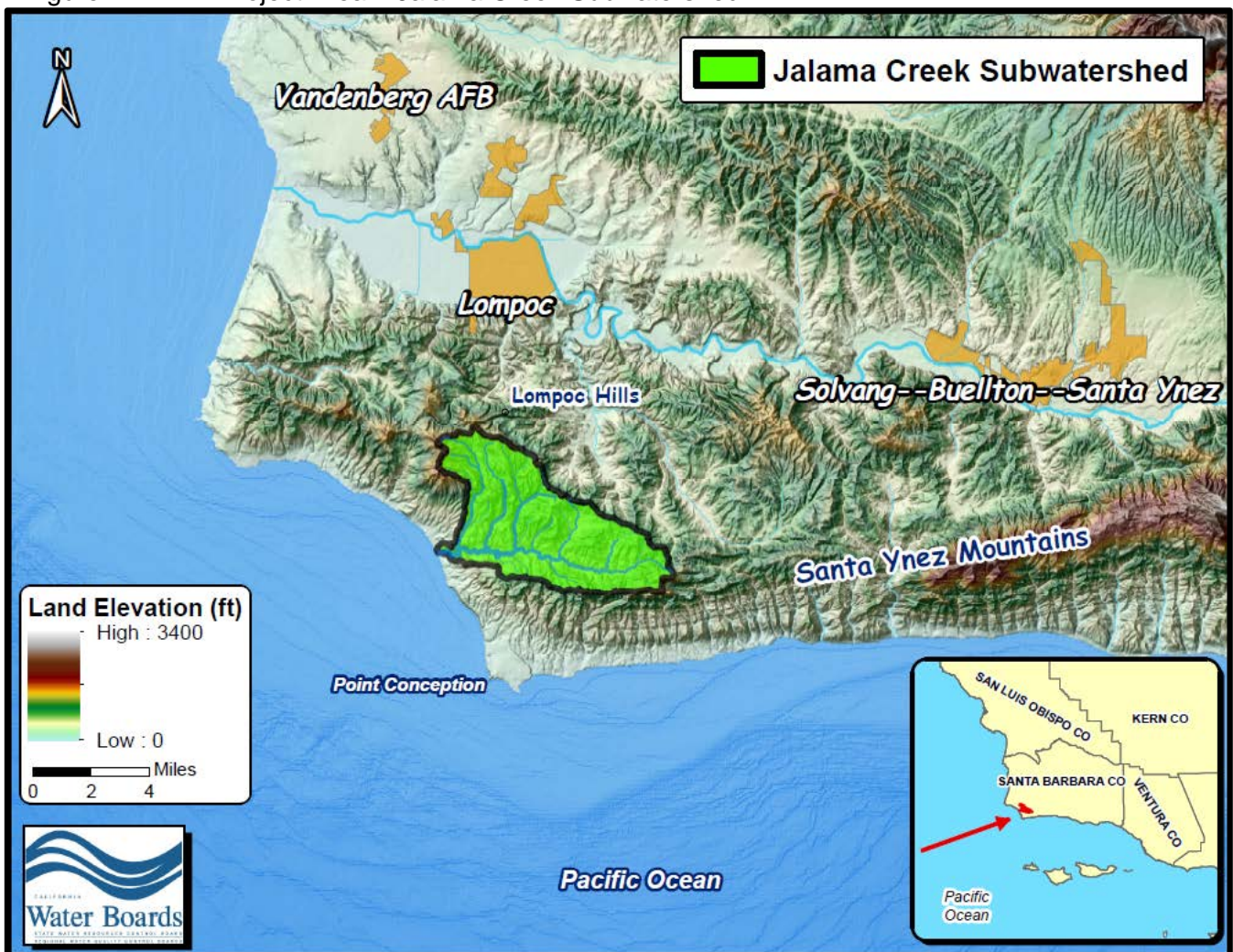
**ATTACHMENTS:**

The attachments are available at:

[http://www.waterboards.ca.gov/centralcoast/water\\_issues/programs/tmdl/docs/jalama\\_creek/index.shtml](http://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/jalama_creek/index.shtml)

1. Resolution No. R3-2013-0030
2. Final Project Report: “Total Maximum Daily Loads Technical Report and Recommendations for Site Specific Water Quality Objectives for Chloride and Sodium in the Jalama Creek Subwatershed”
3. Notice of Opportunity for Public Comment
4. Notice of Public Hearing

Figure 1. TMDL Project Area – Jalama Creek Subwatershed.





**Appendix A – Concise tabular summary of the proposed Jalama Creek total maximum daily loads (TMDLs)**

| <b>JALAMA CREEK TMDLS FOR CHLORIDE AND SODIUM – CONCISE SUMMARY</b><br>California Regional Water Quality Control Board, Central Coast Region |   |
|--|---|
| <b>Waterbody Identification</b>  | Jalama Creek and tributaries from confluence with Jalama Creek estuary upstream to the headwaters.<br>WBID: CAR3151005119990304115034   |
| <b>Location</b>  | Santa Barbara County, California<br>Hydrologic Unit Code # 180600130101   |
| <b>TMDL Pollutants of Concern</b>  | Chloride, Sodium  |
| <b>Pollutant Sources</b>   | Natural background  |
| <b>Beneficial Uses Currently Supported</b><br><i>(on the basis of chloride and sodium numeric water quality guidelines)</i>                  | Protected for drinking water supply (MUN).<br>Protected for aquatic habitat (WARM, SPWN).<br>Protected for most agricultural uses (AGR), including stock watering, support of vegetation for range grazing, and irrigation for most crop types.                     |
| <b>Beneficial Uses Impaired</b><br><i>(on the basis of chloride and sodium numeric water quality guidelines)</i>                             | Impaired for potential or future use of irrigation supply (AGR) for sprinkler irrigation on sodium and chloride-sensitive crops, depending on situation-specific conditions of crop, soil, and method of irrigation.  |
| <b>Loading Capacity</b><br><i>(on the basis of chloride and sodium TMDL numeric targets)</i>   | Chloride: 303 pounds per day and not to exceed 106 mg/L in receiving waters.<br>Sodium: 197 pounds per day and not to exceed 69 mg/L in receiving waters.   |
| <b>TMDL Numeric Targets</b><br><i>(on the basis of numeric guidelines used in 303(d) assessment)</i>   | Chloride not to exceed 106 mg/L (in receiving waters)<br>Sodium not to exceed 69 mg/L (in receiving waters)   |
| <b>Interim Numeric Targets</b><br><i>(interim water quality targets reflective of local natural conditions)</i>                              | Chloride not to exceed 185 mg/L (in receiving waters)<br>Sodium not to exceed 120 mg/L (in receiving waters)  |
| <b>Implementation Strategy:</b><br><b>Proposed Actions to Correct 303(d)-Listed Impairments</b>  | Implement revised water quality guidelines, which may include site-specific water quality objectives, for chloride and sodium based on the assessment that exceedances are naturally occurring and no current impacts to agricultural supply (AGR) beneficial uses. |