

INFORMATIONAL DOCUMENT

Potential Basin Plan Amendments to
Ensure Appropriate Groundwater Beneficial Use Protection
for
the Hodson/Littlejohns Fault Zone Area
Located near Copperopolis in Calaveras County

June 2011

Disclaimer: This document was prepared by staff of the California Regional Water Quality Control Board, Central Valley Region as background material for discussion purposes.

While this document is part of a regulatory process, no specific policy or regulation is intended at this time.

1 EXECUTIVE SUMMARY

Staff of the California Regional Water Quality Control Board, Central Valley Region (“Central Valley Water Board” or “Board”) is evaluating a proposal to amend the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition, revised September 2009 (the “Basin Plan”) to de-designate groundwater within a specific region of Salt Spring Valley in western Calaveras County.

2 INTRODUCTION

The Basin Plan currently requires the Central Valley Water Board to protect all groundwater in the Salt Spring Valley to levels appropriate for use as municipal and domestic supply (“MUN”), agricultural supply (“AGR”), industrial service supply (“IND”), and industrial process supply (“PRO”). However, naturally-occurring geologic conditions may render these beneficial uses unattainable in certain portions of the Salt Spring Valley. Therefore, Board Staff is evaluating a proposal to amend the Basin Plan to de-designate these beneficial uses in areas of the Salt Spring Valley.

The Central Valley Water Board's Basin Planning process is an “exempt regulatory program” under the California Environmental Quality Act (“CEQA”). This does not mean that the Board is exempted from considering the environmental effects that its Basin Planning actions will have on the environment. Rather, the “exempt regulatory program” designation has been applied to the Board's Basin Planning Program because this program includes rigorous environmental analysis; the Secretary of Natural Resources has determined that this rigorous environmental analysis may substitute for the traditional analytical process required under CEQA.

This informational document is intended to solicit discussion regarding the de-designation of beneficial uses in portions of the Salt Spring Valley, and is intended to help fulfill the Board's obligation to seek early public consultation in connection with Basin Planning actions. Comments provided to the Board will help guide the Board's analysis of the significant environmental effects that may result from de-designating beneficial uses in portions of the Salt Spring Valley, and will help guide the Board's consideration of alternatives. In order to facilitate public comments, Board staff will hold a public scoping meeting to assist in identifying issues relevant to stakeholders.

This document is only an initial step in the Central Valley Water Board's planning process. After comments on this document are submitted to the Board, staff will consider all of the issues that commenters may raise, and will circulate a draft staff report for further comment. The draft staff report will include a completed CEQA checklist and the Board's analysis of the potentially significant adverse environmental effects of the project. In addition, the Board's scientific conclusions will be subjected to peer review pursuant to Health and Safety Code section 57004.

The Board would like to receive comments regarding the de-designation of groundwater beneficial uses in the project area and the direct, indirect, and cumulative environmental impacts that could result from de-designation. The Board would also like to receive comments regarding potential regulatory alternatives, which include the development of site-

specific water quality objectives, and comments regarding any other environmental issues, including issues involving implementation of water quality standards (both existing and proposed) in the project area.

3 REGULATORY AUTHORITY AND MANDATES FOR BASIN PLAN AMENDMENTS, AND THE STATE WATER BOARD REMAND ORDER

The State Water Resources Control Board (the “State Water Board”) and the nine Regional Water Quality Control Boards (collectively referred to as the “Water Boards”) are the state agencies with the primary responsibility for coordination and control of water quality. (Water Code § 13000.) Each of the Water Boards has adopted water quality control plans, which provide the basis for regulatory actions to protect water quality. (Water Code §13240 et seq.) The Basin Plans designate the beneficial uses of waters of the state (both groundwater and surface water) that are to be protected, establish water quality objectives designed to protect these beneficial uses, and include programs designed to achieve these water quality objectives (referred to as “implementation plans”). (Water Code § 13050(j).)

The Central Valley Water Board has adopted the Basin Plan, which applies to surface water and groundwater within the entire Sacramento River and San Joaquin River drainage basin, including the Salt Spring Valley.

The Basin Plan provides the following definition of groundwater:

“the term “ground water” includes all subsurface waters that occur in fully saturated zones and fractures within soils and other geologic formations, whether or not these waters meet the definition of an aquifer or occur within identified ground water basins.”

As mentioned above, the Central Valley Water Board’s Basin Planning Program, under which the Board can adopt amendments affecting beneficial designations, water quality objectives, or implementation programs, is an “exempt regulatory program” and is subject to certain specialized CEQA requirements. When amending the Basin Plan, the Board must perform an environmental analysis of the reasonably foreseeable methods of compliance and must prepare “substitute environmental documentation” that fulfills the same informational needs as traditional CEQA documents, and must seek early public consultation.

3.1 BENEFICIAL USES

The Basin Plan states that:

“[u]nless otherwise designated by the Regional Water Board, all ground waters in the Region are considered as suitable or potentially suitable, at a minimum, for municipal and domestic water supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO).”

The Basin Plan also incorporates State Water Board Resolution 88-63 (the “Sources of Drinking Water Policy”), and has assigned the MUN beneficial use to all surface and ground waters regulated by the Basin Plan. In making exceptions to the beneficial use designations, the Board must find that either:

- (1) The total dissolved solids (TDS) exceed 3,000 mg/L (5,000 µmhos/cm electrical conductivity), or

- (2) There is contamination, either by natural processes or human activity, that cannot reasonably be treated for domestic use, or
- (3) There is insufficient water supply, or
- (4) The aquifer is regulated as a geothermal energy producing source.

The Sources of Drinking Water Policy does not establish objectives for constituents that may threaten source waters designated MUN.

3.2 WATER QUALITY OBJECTIVES

The Porter-Cologne Water Quality Control Act ("Porter-Cologne") (Water Code § 13000 et seq.) defines water quality objectives as "...the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." (Water Code § 13050(h).) Porter-Cologne requires each regional water board to establish water quality objectives that will ensure the reasonable protection of beneficial uses and the prevention of nuisance. Porter-Cologne recognizes that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses. Factors considered by a regional water board in establishing water quality objectives include, but are not necessarily limited to:

- (a) Past, present, and probable future beneficial uses of water.
- (b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.
- (c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.
- (d) Economic considerations.
- (e) The need for developing housing within the region.
- (f) The need to develop and use recycled water.

3.3 IMPLEMENTATION PROGRAM

As specified in Porter-Cologne, an implementation program for achieving water quality objectives shall include, at the minimum:

- (a) A description of the nature of actions which are necessary to achieve the objectives, including recommendations for appropriate action by any entity, public or private;
- (b) A time schedule for the actions to be taken; and
- (c) A description of surveillance to be undertaken to determine compliance with objectives. (Water Code § 13242.)

Surveillance monitoring establishes baseline conditions, allows for comparison of water quality conditions inside and outside of a project area, measures the effectiveness of actions, and provides a mechanism to trigger additional actions if certain environmental conditions are met.

The State Water Board has adopted regulations governing the discharges of waste to land, but it is the responsibility of the regional water boards to make decisions regarding cleanup and abatement goals and objectives for the protection of water quality and the beneficial uses of waters of the state within each region. Cleanup and abatement alternatives that entail the discharge of residual wastes to waters of the state, that discharge to regulated waste management units, or that leave wastes in place, create additional regulatory constraints and

long-term liability, which must be considered in any evaluation of cost-effectiveness. (Findings 22, 24 and 25 of State Water Board Resolution 92-49, as amended by State Water Board Resolution 96-79.) The Central Valley Water Board may establish an implementation program in the Basin Plan that considers the unique conditions in a project area, and may include discharge specifications and requirements that provide reasonable protection of beneficial uses.

An essential element of a water monitoring program associated with solid waste management units (WMUs; e.g., mining waste units) is the establishment of a groundwater monitoring system (Cal. Code Regs., tit. 27, § 20415.) that satisfies certain requirements (Cal. Code Regs., tit. 27, § 20420, 20425, and 20430.). The monitoring system must include a sufficient number of Background Monitoring Points (as defined in Cal. Code Regs., tit. 27, § 20164) installed at appropriate locations and depths to yield ground water samples that represent the quality of ground water that has not been affected by a release from the WMU. A sufficient number of appropriately-located monitoring points must be installed that represent the quality of ground water passing the Point of Compliance and to allow for the detection of a release from the WMU. The implementation program must also provide for situations that threaten human health or safety or the environment, such as an unauthorized release. Under these situations, the regional water board may do one, or more, of the following:

- Require the responsible party to submit a time schedule of specific actions they will take to correct or prevent a violation of requirements.
- Issue an order that requires the responsible party to cease and desist and either (a) comply forthwith, (b) comply in accordance with a time schedule set by the board, or (c) in the event of a threatened violation, take appropriate remedial or preventive action.

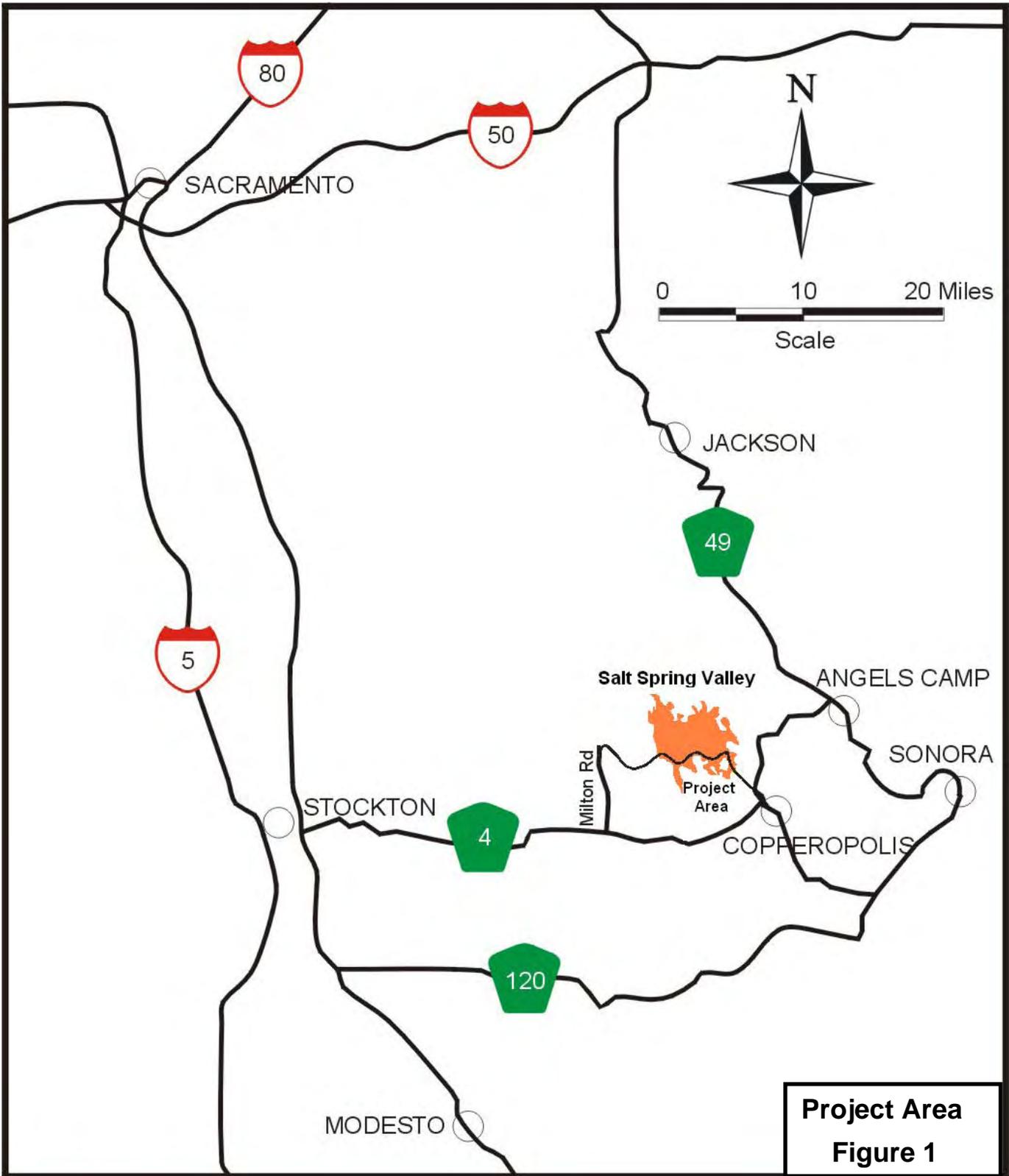
3.4 STATE WATER BOARD REMAND - WQO 2004-0007

On 20 May 2004, the State Water Board issued WQO 2004-0007 (the “State Board Order”), in which the State Water Board conducted a review of Cease and Desist Order R5-2003-0055, issued to address water quality concerns at the Royal Mountain King Mine (“RMKM”). Among other things, the State Board Order concluded that alternative approaches other than strict compliance with requirements contained in California Code of Regulations, title 27 (hereafter “Title 27”) may be an appropriate part of a long-term resolution of water quality problems in the RMKM area. These suggested alternate approaches include the de-designation of beneficial uses and/or the establishment of a groundwater containment zone.

Board staff is considering a proposal to de-designate beneficial use designations in portions of the Salt Spring Valley where naturally-high levels of TDS are found. Board staff is also requesting comments regarding other regulatory options, such as a containment zone or the adoption of site-specific water quality objectives.

4 PROJECT AREA DESCRIPTION

The project area is in the low, rolling hills at the southern end of Salt Spring Valley in western Calaveras County (see Figure 1). The project area includes the 2,100-acre property of the RMKM site. The area north and northeast of the RMKM site is mostly used for cattle grazing and ranches. The hilly areas to the southeast, south, and west of the RMKM site have been



subdivided into approximately 25-acre parcels of the Diamond XX Ranch Estates. Some of the Diamond XX properties have individual private well(s) that are used as a domestic water source.

The Salt Spring Valley includes saline springs, several of which occurred on the RMKM site and were associated with the prehistoric Skyrocket archaeological site that is more than 9,000 years old (Fagan, 2003). Surface waters in the project area include Littlejohns Creek, Clover Creek, Underwood Creek, and several unnamed creeks that are seasonal creeks that discharge into Littlejohns Creek. Approximately one mile downstream from the RMKM site, Littlejohns Creek enters Flowers Reservoir. Flowers Reservoir discharges to French Camp Slough, a tributary to the San Joaquin River and the Sacramento-San Joaquin Delta.

4.1 GEOLOGY AND GROUNDWATER

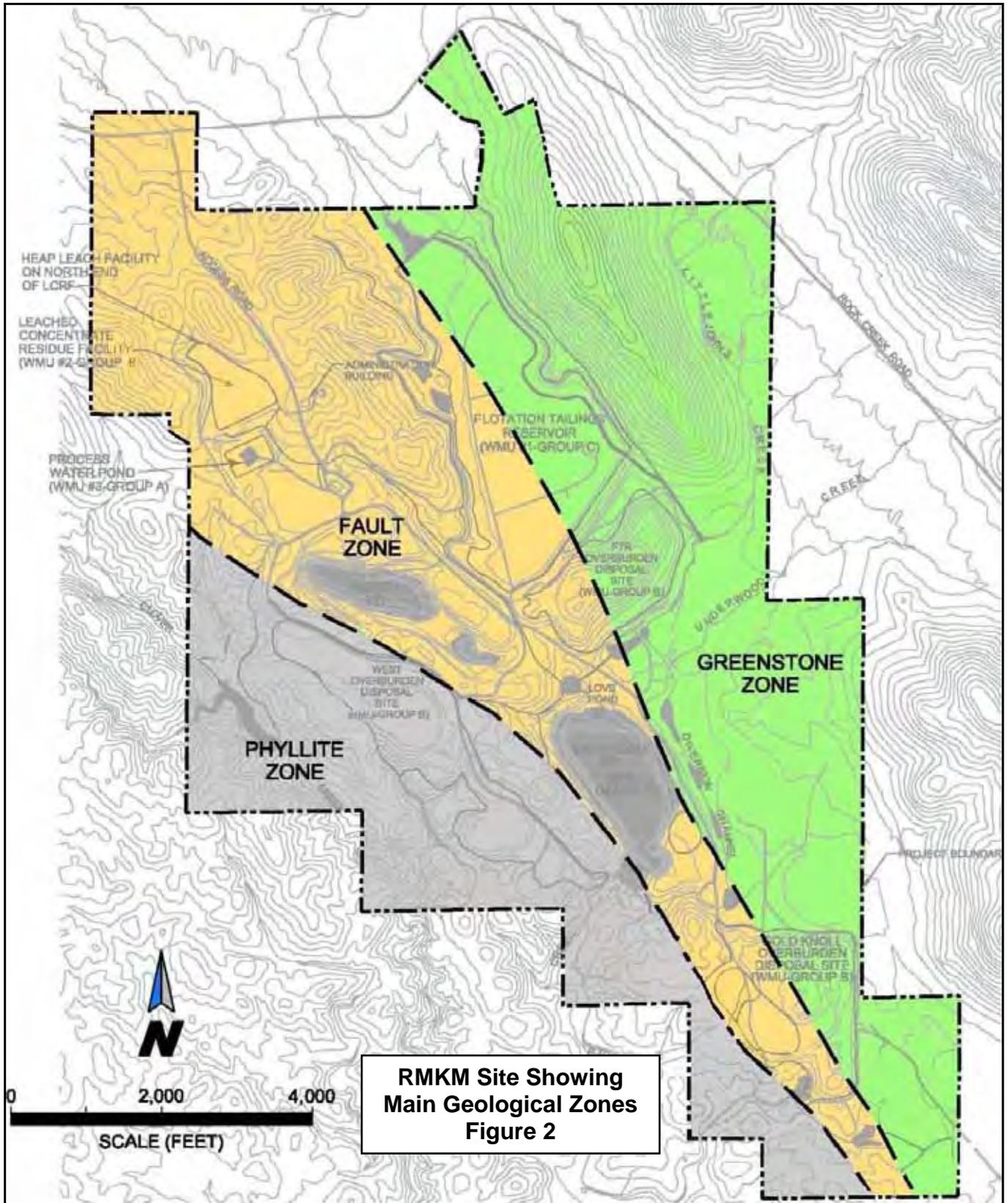
The project area is underlain by three main geological zones--fine-grained, metamorphosed sediments (phyllite), metamorphosed volcanic rocks (greenstone), and an intermediate fault zone consisting of interleaved slabs of phyllite and greenstone. These zones, and the rocks within the zones, are typically oriented nearly vertically, and they generally trend toward the north and northwest.

The main zone of phyllite (part of the Salt Springs Slate formation) underlies and extends westward from the inactive Hodson Fault. Phyllite typically has low porosity and permeability due to its fine-grained texture such that groundwater flow is primarily through fractures. In the project area, groundwater in the phyllitic zone is naturally saline, composed predominantly of dissolved sodium and chloride ions. Two northwest-trending 'lobes' of highly saline groundwater with total dissolved solids ("TDS") levels that range to over 10,000 mg/L occur on the west side of Hodson Fault and appear to be separated, somewhat, by a narrow zone of groundwater with slightly lower TDS levels that lies approximately beneath Littlejohns Creek in that area.

The main zone of greenstone (part of the Copper Hill Volcanics formation) underlies, and extends eastward from the inactive Littlejohn Fault zone. Greenstone, also, typically has low porosity and permeability, but transmissivity may be higher than in the phyllite because the greenstone tends to have more joints and fractured zones. In the project area, most of the available geology and groundwater information are from the RMKM site (see Figure 2). Groundwater in the greenstone zone is better than in the other zones, and the TDS is composed predominantly of dissolved calcium, magnesium, and bicarbonate ions. Background TDS levels in groundwater within the greenstone zone are generally less than 500 mg/L.

The middle of the project area lies within a fault zone bounded by the Hodson and Littlejohns faults, which splay to the northwest and converge toward the southeast. It contains poor, but highly variable quality, groundwater due to the presence of phyllite, mineralized zones, and past mining activities.

Adding to the geological and hydrological complexity of the project area are other, smaller faults and numerous joints that cross the main fault zones. The cross structures may locally affect surface water and groundwater flow. More than 40 wells have been constructed on the RMKM site to monitor groundwater quality and flow conditions. Groundwater flow directions



**RMKM Site Showing
Main Geological Zones
Figure 2**

interpreted from groundwater surface elevation contours based on monitoring well data and surface water elevations indicates a complex pattern beneath the RMKM site.

4.2 ROYAL MOUNTAIN KING MINE SITE

RMKM operated as an open-pit gold mine from March 1989 to June 1994. Gold ore, overburden, and waste rock were excavated from three pits (from south to north—Gold Knoll Pit, Skyrocket Pit, and North Pit). Gold Knoll Pit was backfilled with waste rock and overburden from Skyrocket Pit and North Pit as they were mined. Waste rock and overburden were also placed into the West overburden disposal site (“ODS”) and the Flotation Tailings Reservoir ODS (see Figure 3). RMKM is the only permitted waste discharge site in the project area.

The three ODSs were originally thought to be chemically inert and were classified Group C mining waste when they were being constructed. At the time, they were not required to have prescriptive containment features. Currently, the material comprising these WMUs are known to have nonhazardous soluble pollutants with concentrations which exceed water quality objectives and could cause degradation of waters of the state and has been reclassified as Group B mining waste. (Cal. Code Regs., tit. 27, § 22470 et seq.) Group B mining waste management units require prescriptive containment features or alternative containment features that are demonstrated to be engineered-equivalents to the prescriptive systems.

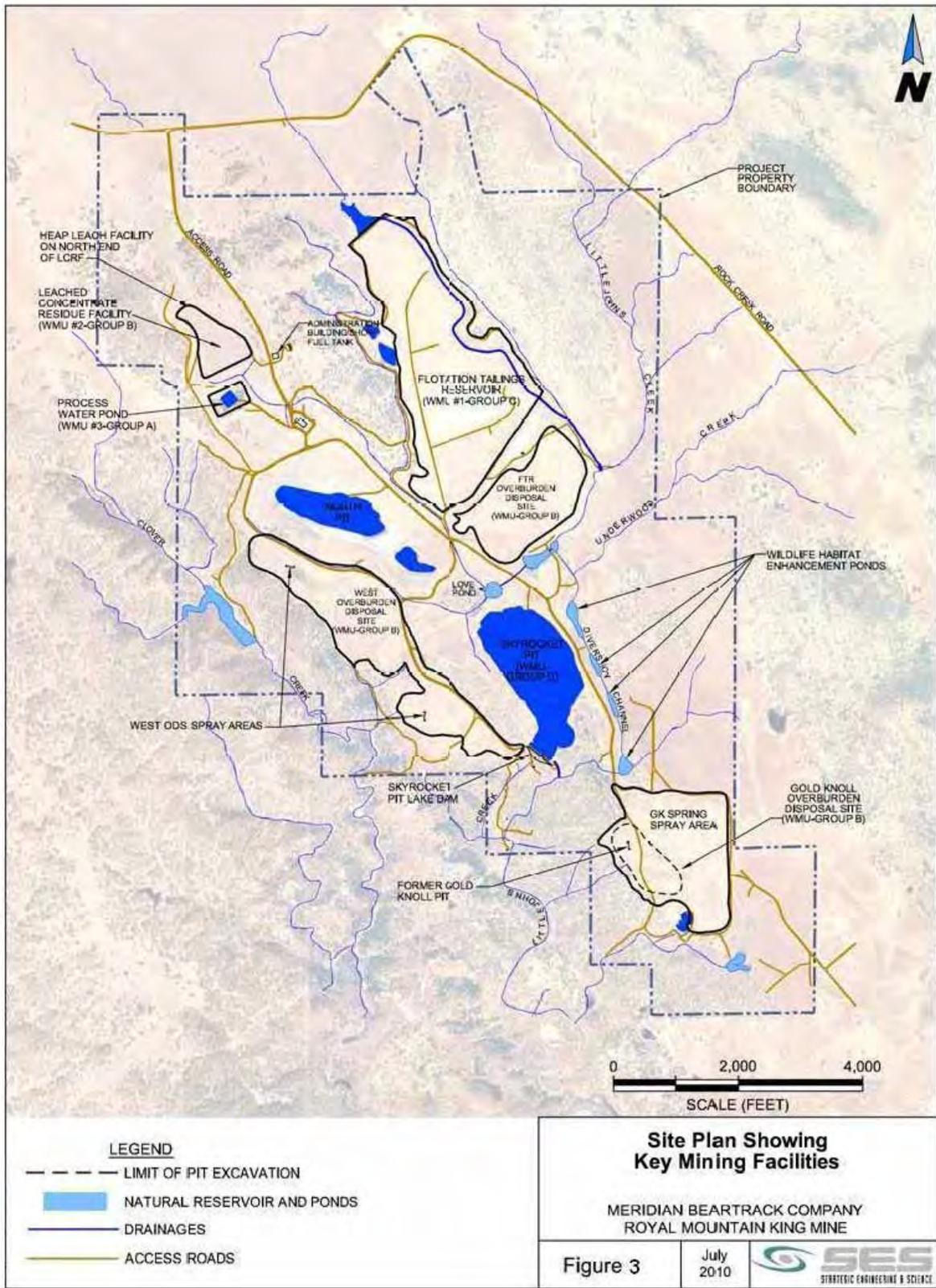
Prior to mining operations at RMKM, Littlejohns Creek flowed seasonally, from the northeast toward the southwest across the middle of the RMKM site. During RMKM mining activities, Littlejohns Creek was diverted southwestward around the eastern and southern sides of Skyrocket Pit. Since then, Littlejohns Creek discharges almost continuously from the original creek bed near the southwestern project area boundary.

The RMKM site ceased mining operations in 1994, and the responsible parties are working to close the site. As discussed earlier, the ODSs were initially classified as inert waste and were subsequently reclassified to be Group B mining waste, which requires prescriptive containment features. For this site, it would be economically impracticable and regulatorily unjustifiable to require the current ODSs to be reconstructed to meet Group B mining waste requirements. In addition, the State Board Order concluded that alternative approaches other than strict compliance with Title 27 Group B prescriptive requirements, as authorized by Title 27, may be an appropriate part of a long-term resolution of water quality problems in the RMKM area.

The Central Valley Water Board has regulated discharges to surface water and groundwater at the RMKM since 1988. Current discharges at the site are regulated in accordance with NPDES Permit R5-2007-0162 and Waste Discharge Requirements Order R5-2008-0021.

5 PROBLEM STATEMENT

Groundwater quality in the project area is variable, with areas of poor to very poor quality water. According to the State Board Order, saline springs and recent open-pit gold mining and related activities in the area have impacted groundwater quality. Central Valley Water Board staff is considering a proposal to develop a Basin Plan amendment that would de-



designate areas of poor quality water within the project area. As part of the Board's basin planning process, the Board will evaluate which areas of groundwater meet the conditions in the Sources of Drinking Water Policy for beneficial use de-designation. The Central Valley Water Board would consider removing the MUN, AGR, PRO and/or IND beneficial uses in these areas. Any scientific information developed that would result in a proposal to de-designate beneficial uses of the Salt Spring Valley would have to meet rigorous peer-review requirements.

6 PROVISIONAL PROPOSED PROJECT FOR CEQA SCOPING

A provisional project promotes discussion during CEQA scoping to identify potential environmental impacts that could occur if the proposed project is adopted. The goal of the project (and alternatives) is to appropriately delineate the groundwater beneficial uses that the Board will protect within the project area (see Problem Statement, Section 5).

The assigned beneficial uses of groundwater in the project area include MUN, AGR, PRO, and IND. The Central Valley Water Board may de-designate beneficial uses of waters that meet the conditions of State Water Board Resolution 88-63 and the Basin Plan.

Proposal: Consider De-designation of the MUN, AGR, PRO, and/or IND Beneficial Uses at the Project Area

The MUN, AGR, PRO, and IND beneficial uses would be de-designated for groundwater beneath a defined dedesignation area. Water quality objectives for the MUN, AGR, PRO, and IND beneficial uses would no longer be applicable for the dedesignation area, but they would remain in place outside of that area.

The groundwater in the project area is variable with some areas of poor- to very poor-quality groundwater. The ground water hydrology and variable water quality conditions are the result of natural geologic formations and minerals associated with gold, and have also been impacted due to mining activities and inappropriate regulation of the waste management units at the site. The State Board Order concluded that alternative approaches other than strict compliance with Title 27 requirements may be an appropriate part of a long-term resolution of water quality problems in the RMKM area. One of the alternate approaches is the de-designation of beneficial uses.

In order to consider de-designating ground water beneficial uses, the Board staff must have adequate information to justify the de-designation of beneficial uses in accordance with the Sources of Drinking Water Policy. In addition, Board staff must have adequate information to delineate the groundwater that the Central Valley Water Board may consider suitable for de-designation. There is technical uncertainty regarding the potential boundaries of such a zone.

It is worth noting that even if the Board approves a Basin Plan amendment that de-designates beneficial uses of groundwater at the RMKM site, the Board would still be obligated to protect any beneficial uses *unaffected* by the Basin Plan amendment, for example MUN uses in adjacent areas.

7 PROJECT ALTERNATIVES

The Board staff is proposing to consider a Basin Plan amendment that would de-designate certain beneficial uses that cannot be achieved in the Salt Spring Valley due to natural geologic conditions. However, there are alternative planning and regulatory options that may also be explored, including the adoption of site-specific objectives and the implementation of a containment zone in the project area. The elements and alternatives described below are not considered an exhaustive list. Rather, they are a starting point for inviting public participation in identifying other alternatives and potential environmental concerns with each alternative identified during the CEQA scoping process. For each of the alternatives, the final CEQA document will address the means to monitor for potential environmental impacts, triggers to implement measures to mitigate the impacts, and potential mitigation measures.

7.1 WATER QUALITY OBJECTIVES ALTERNATIVES

Groundwater at the site has elevated levels of TDS/EC (electrical conductivity), sulfates and arsenic. The Central Valley Water Board has a policy whereby background conditions need not be improved if background water quality exceeds applicable water quality objectives. Site specific water quality objectives (SSOs) for ground water may be developed based on background site conditions, and the uses that are made of the water locally. If there is no modification of the current applicable beneficial uses, SSOs would need to protect MUN, AGR, PRO and IND as they occur in the project area. SSOs also must maintain downgradient beneficial uses, so an evaluation is necessary to assure that any proposed SSOs do not adversely affect applicable downgradient beneficial uses or water quality objectives.

Protection of the MUN beneficial use

The applicable water quality objectives to protect MUN include the secondary maximum contaminant levels (“MCLs”) for TDS and sulfate, which do not have fixed consumer acceptance contaminant levels. Instead, three levels are provided based on the situation facing the water supplier:

	Secondary Maximum Contaminant Level Ranges		
Constituent, Units	Recommended	Upper	Short Term
Total Dissolved Solids, mg/L	500	1,000	1,500
Sulfate, mg/L	250	500	600

The “Recommended” contaminant level is considered desirable for a higher degree of consumer acceptance. The “Upper” contaminant level is considered acceptable if it is neither reasonable nor feasible to provide more suitable waters. The “Short Term” contaminant level is only acceptable for existing community water systems on a temporary basis pending construction of treatment facilities or development of acceptable new water sources.

The Central Valley Water Board has not developed any policies to determine what conditions are applicable for the different levels and has generally protected the MUN beneficial use with the “Recommended” contaminant level. In considering the current variable and poor water

quality conditions in the project area, the Central Valley Water Board could determine that the upper or short term contaminant level is the appropriate water quality objective to protect MUN.

Protection of AGR beneficial use

Agricultural water quality criteria vary depending on land use—whether there is livestock watering or what types of crops there are. Generally, livestock will tolerate poorer water quality than humans, so protection of MUN should also protect the stock watering portion of AGR. Selecting appropriate water quality objectives for crops is based on the types of crops that will be irrigated with the water and the acceptable yield reduction if the irrigation water is allowed to become more saline. The main agricultural activity in the project area is cattle grazing. For irrigation, the constituents of concern are typically TDS/EC and chlorides. In developing SSOs for the site conditions, only TDS/EC will need to be evaluated for the expected crop types which are forage crops. The most sensitive forage crops can tolerate EC levels of 1,500 umhos/cm without suffering any reduction of crop yield and up to 3,200 umhos/cm with only 10% reduction (irrigation water information references available online at: <http://www.ext.colostate.edu/pubs/crops/00506.html> and <http://ucanr.org/freepubs/docs/8066.pdf>).

Protection of PRO and IND beneficial uses

The concerns for industrial uses are usually corrosion and scaling. Industrial process uses require varying water quality, and the water at the site has been used for mining purposes. Therefore, the Central Valley Water Board could determine that these uses are protected with SSOs that provide reasonable protection of the MUN and AGR beneficial uses.

7.2 IMPLEMENTATION PROGRAM ALTERNATIVES

The Central Valley Water Board could adopt an implementation plan that would recognize that it is “not consistent with maximum benefit to the people of the state” to clean up groundwater that has been impacted by natural geologic formations and waste discharges to levels that achieve the applicable water quality objectives or fully protect beneficial uses within a controlled area or a groundwater management area.

The Central Valley Water Board could issue an enforcement order for the RMKM site, designating a special groundwater management area where applicable water quality objectives will not be met and where beneficial uses will not be fully protected. Groundwater cleanup would not be required within the special management area, and water quality objectives would not apply. However, off-site groundwater beneficial uses will be fully protected. The enforcement order would need to include adequate monitoring requirements to identify potential off-site impacts and subsequent actions to protect the off-site groundwater.

7.3 NO ACTION ALTERNATIVE

The Central Valley Water Board could decide not to take any additional action by not adopting either the proposed provisional project or any alternative project. Existing water quality objectives protective of beneficial uses would continue to apply to groundwater throughout the project area consistent with existing water boards’ plans, policies, and orders.

Cited References

Fagan, B.M. 2003. *Before California: An Archaeologist Looks At Our Earliest Inhabitants*. AltaMira Press , a division of Rowman & Littlefield Publishers, Inc. 1630 North Main Street, #367. Walnut Creek, CA, USA 94596.

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State Water Resources Control Board (SWRCB). 2004. Order No. WQO 2004-0007. In the matter of the Petition of Meridian Beartrack Company, Meridian Gold Company, And Felix Mining Company For Review of Cease And Desist Order No. R5-2003-0055 For Royal Mountain King Mine Issued by the California Regional Water Quality Control Board, Central Valley Region, SWRCB/OCC File A-1569.