4. Compliance with the California Environmental Quality Act

The Regional Water Board is the lead agency for evaluating the environmental impacts of Basin Plan amendments pursuant to the California Environmental Quality Act (CEQA). Although subject to CEQA requirements, the Regional Water Board basin planning process is certified by the Secretary for Resources as "functionally equivalent" to CEQA, and therefore exempt from the requirement for preparation of an environmental impact report or negative declaration and initial study[1]. The State Water Resources Control Board (State Water Board) has promulgated guidelines for exempt regulatory programs that describe the documents required for the adoption or approval of standards, rules, regulations or plans[2]. These documents must do the following:

1. Provide a brief description of the proposed activity.
   In this case, the proposed activity is the adoption of a Basin Plan amendment including:
   a) Addition of a Water Quality Objective for Groundwater Toxicity;
   b) Revisions to the Chemical Constituents Water Quality Objective for Groundwater and Surface Waters;
   c) Revision to the existing water quality objective for Dissolved Oxygen (DO) in surface waters; and
   d) Substantive editorial and organizational changes to Section 3 and Section 4 of the Basin Plan to improve clarity on implementation of water quality objectives and readability. The rationale to support the proposed Basin Plan amendment is fully described in Chapters 2 and 3 of this Staff Report. A more detailed project description is provided in Section 4.1.

2. Provide a reasonable discussion of alternatives to the proposed activity.
   An alternatives analysis is provided in Section 4.3.

3. Provide an analysis of mitigation measures needed to minimize any potentially significant adverse environmental impacts of the proposed activity.
   Discussion is provided in Section 4.4.

Additionally, for actions by the Regional Water Board that adopt a rule or regulation requiring the installation of pollution control equipment, establish a performance standard or establish a treatment requirement, CEQA[3] and CEQA Guidelines[4] require an environmental analysis of the reasonably foreseeable methods by which compliance with that rule or regulation will be achieved. An SED satisfies this requirement if it contains the following components, some of which are a repetition of the list above:

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1 Cal. Code Regs., tit. 14, § 15251 subd.(g).
2 Cal. Code Regs., tit. 23, § 3777.
3 Pub. Resources Code, § 21159 subd. (a).
4 Cal. Code Regs., tit.14, § 15187 subd. (c).

1. An analysis of the environmental impacts resulting from implementation of the reasonably foreseeable methods of compliance. The reasonably foreseeable methods of compliance (hereinafter compliance measures) are the potential actions that responsible parties may employ to comply with the water quality objectives in the Basin Plan. This analysis is presented in Sections 4.4 and 4.5.
2. An analysis of the reasonably foreseeable feasible mitigation measures relating to the identified environmental impacts. This analysis is presented in Sections 4.4 and 4.5.
3. An analysis of reasonably foreseeable alternative means of compliance with the rule or regulation, which would avoid or eliminate any identified impacts. This analysis is presented in Section 4.6.

The environmental analysis must take into account a reasonable range of:[5]

- Technical factors (see Analysis of Compliance Measures, Associated Environmental Impacts, and Potential Mitigation Measures, Sections 4.4 and 4.5.);
- Population (see Environmental Setting and Land Use, Section 2.1);
- Geographic areas (see Environmental Setting and Land Use, Section 2.1);
- Specific sites (see Analysis of Compliance Measures, Associated Impacts, and Potential Mitigation Measures, Sections 4.4 and 4.5.); and
- Economic Consideration (see Chapter 5).

While the Board is required to consider of a "reasonable range" of the factors listed above, an examination of every site is not required, only consideration of a reasonably representative sample of sites. In meeting the requirements of CEQA section 21159, the regional board is not required to conduct a "project level analysis[6]." Rather, in most circumstances, a project level analysis will be performed by the responsible party or the agency with jurisdiction when an activity is conducted in conformance with the program evaluated here.

Consistent with the CEQA, this document does not engage in speculation or conjecture, but rather considers the project alternatives, the reasonably foreseeable environmental impacts of the reasonably foreseeable methods of compliance, and the mitigation measures which would be required to avoid, minimize, or mitigate the identified impacts. The adoption of the proposed WQO Update Amendment does not result in any direct adverse effects on the environment. All potentially significant adverse effects are related to individual specific projects or permits and specific compliance measures which may be implemented in conformance with the proposed amendment. The analysis provided uses specific circumstances as examples or illustration of how this proposed WQO Update Amendment could be implemented, and thus affect the environment. However, this analysis does not constitute an absolute outcome or certainty in the determinations made

[5] Cal. Code Regs., tit. 14, § 15187 subd.(d); Cal.Code Regs.,tit.23 § 3777; Pub. Resources Code, § 21159 subd. (c).
[6] Public Resources Code, § 21159 subd. (d).

in this Staff Report. Therefore, this environmental analysis is set at a programmatic level and is more general in nature to cover the range of potential effects.

4.1 Description of the Project

The proposed WQO Update Amendment includes a number of actions relative to updating water quality objectives for both surface waters and groundwaters in the North Coast Region. The four main components of the proposed WQO Update Amendment are:

1) Develop a new narrative groundwater toxicity objective;
2) Update the chemical constituents objectives for surface waters and groundwaters;
3) Update the dissolved oxygen (DO) objectives for surface waters; and
4) Include substantive editorial revisions to improve clarity on the implementation of water quality objectives, readability and organization through non-substantive editorial changes.

Currently Regional Water Board staff use the authorities in the existing Basin Plan in combination with statewide policies such as the *Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Plan or SIP); *Antidegradation Policy Resolution No. 68-16* (State Water Board Res No. 68-16); and *Policy on Cleanup and Abatement* Resolution No. 92-49 (State Water Board Res No. 92-49), and other established and relevant numeric water quality criteria when issuing permits, orders, or other regulatory actions. Since this process is complex and promotes confusion and contention, staff has included additional language to make more explicit the responsibilities and authorities of the Regional Water Board with respect to the establishment and implementation of water quality objectives.

The proposed amendment is designed to update the existing aquatic life criteria to include protection against both acute and chronic effects of DO impairment. The proposed amendment also addresses the problems associated with Table 3-1 of the Basin Plan in which waterbody-specific objectives (WSOs) for DO are assigned to individually named waterbodies in the Region. The problems this amendment will solve include: 1) a reliance on day time grab-sample data to define the daily minimum condition, and 2) an inconsistency in approach to the WSOs between waterbodies in the Klamath River Basin and those in the North Coastal Basin. The proposed solution to the problems associated with the WSOs for DO is to replace the WSOs with a natural conditions clause which requires that the natural pattern and range of ambient DO variability be maintained in those waterbodies which cannot, due to natural conditions, meet the aquatic life criteria.

The revisions proposed in the water quality objective Basin Plan Amendment project are presented below.

1) **Add a new narrative toxicity water quality objective for groundwater (Basin Plan Section 3)**
    a. A new narrative toxicity groundwater objective is intended to be more direct and transparent in regards to the protection of the beneficial uses of groundwater. Rather than solely relying on a footnote in the Basin Plan, the Antidegradation Policy (Res. No 68-16), the Policy for Cleanup and Abatement of Discharges (Res. No 92-49), and/or other existing authorities when establishing numeric thresholds necessary to protect beneficial uses which are used as a basis for calculating/developing effluent limits, cleanup or action levels, Regional Water Board staff can simply point to a toxicity objective for groundwater. The existing policies will still be adhered to; however, a groundwater toxicity objective is elegant in its simplicity.

2) **Update the water quality objectives for chemical constituents in surface water and groundwaters (Basin Plan Section 3)**
    a. Revision of the narrative chemical constituents objectives (surface water and groundwater) to clearly apply to the protection of all beneficial uses.
    b. Delete Table 3-2, *Inorganic, Organic, and Fluoride Concentrations Not to be Exceeded in Domestic or Municipal Supply*.
    c. Prospectively incorporate the Primary and Secondary MCLs listed in Title 22 of the California Code of Regulations, , as the minimum water quality objectives for chemical constituents to protect beneficial uses.
    d. Revise the narrative pesticides objective (surface waters) to clearly apply to the protection of all beneficial uses and remove the reference to Title 22.
    e. Revise the radioactivity objective (surface waters) to clearly apply to the protection of all beneficial uses and remove the reference to Title 22.

3) **Revise the water quality objective for dissolved oxygen in surface waters (Basin Plan Section 3)**
    a. Revision of the life cycle DO objectives based on USEPA (1986) and other scientific literature as described in Section V.1.3
    b. Elimination of the background DO objectives from Table 3-1 except for Humboldt Bay, Bodega Bay, and ocean waters.
    c. Inclusion of a "natural conditions" clause that allows for the calculation of background DO objectives based on 85% DO saturation during the dry season and 90% DO saturation during the wet season under natural stream temperatures in those waterbodies or reaches of waterbodies where natural conditions prevent the attainment of aquatic life DO objectives.
    d. Elimination of the 7.0 mg/L daily minimum for the *Spawning, Reproduction, and/or Early Development (SPWN)* beneficial use requirement as under protective.
    e. Expansion of the period of time in which the 9.0 mg/L daily minimum SPWN requirement is applied to include all early life stages prior to emergence.

SPWN applies from the time salmonid spawning begins until emergence, estimated in the North Coast Region generally to occur from September 15th to June 4th.

f. Addition of a 7-day average requirement based on the "no production impairment" for SPWN. This is a moving 7-day average of 11.0 mg/L DO in the water column based on seven consecutive daily averages.
g. Addition of daily minimum criteria of 9.0 mg/L to support SPWN; water column criteria that are 3 mg/L greater than the DO concentration required for *Cold Freshwater Habitat (COLD)* of 6.0 mg/L, to support the intragravel environment to protect eggs and pre-emergence life stages.
h. Addition of a 7-day average daily minimums ≥8.0 mg/L for COLD. This is a moving 7-day average of DO in the water column based on 7 consecutive daily minimums.
i. Addition of 6.0 mg/L as a 7-day moving average of the daily minimum for *Warm Freshwater Habitat (WARM)*.
j. Retention of the existing 5.0 mg/L DO objective for *Inland Saline Water Habitat (SAL)* and *Marine Habitat (MAR)* and 6.0 mg/L DO objective for Bodega Bay and Humboldt Bay as adequate protection of these beneficial uses and locations.
k. Adoption of a narrative DO objective for the protection of *estuarine habitat (EST)*: "The dissolved oxygen content of enclosed bays and estuaries shall not be depressed to levels that adversely affect beneficial uses as a result of controllable water quality factors."

4) Edit and organize Basin Plan Section 3

a. Addition of explanatory language in Section 3 generally describing narrative and numeric water quality objectives.
b. Addition of a footnote in Section 3 clarifying that the terms "designated use" and "water quality criteria" are based in federal law.
c. Addition of a footnote in Section 3 clarifying that "beneficial use" and "water quality objectives" are terms derived from state law.
d. Relocation of the existing text in Section 3 describing controllable factors to its own section in Chapter 4. In addition, the phrase "human caused" will be substituted for "man caused."
e. Deletion of outdated or redundant text in Section 3 such as the reference to expired waivers, the description of classes of water (which is presented in Chapter 2 – Beneficial Uses) and the superseding of water quality objectives contained in earlier editions of the Basin Plan.
f. Removal of references in Section 3 to appendices no longer proposed for inclusion in the Basin Plan.
g. Addition of new sub-section in Section 3describing terminology for water quality standards.

h. Addition of new sub-section in Section 3 describing terminology for water quality objectives and effluent limitations.
i. Other minor editorial changes, such as capitalization, punctuation, grammar, and other minor revisions to improve clarity.
j. Implementation of the chapter and section number system used in previous editorial amendments of the Basin Plan (Chapters 1 and 2).
k. Revision of page numbers to remove ".00" from each page, resulting in the format "3-x."

4.2 CEQA Scoping

The Regional Water Board solicited comments from interested persons and governmental agencies regarding the scope and content of the environmental information to be included in the SED. On July 8, 2010, the Regional Water Board held a CEQA Scoping Meeting following circulation of a Public Notice.

The purpose of the meeting was to explain the project and provide related information to resource agency personnel and the interested public and to invite them to submit written comments concerning the range of actions, alternatives to the proposed Basin Plan amendment, mitigation measures, and significant effects that should be analyzed in the SED. Staff provided relevant information including a presentation on the Basin Plan amendment process, the proposed Water Quality Update Amendment, and the CEQA process. Informational handouts included the scoping notice and fact sheet, and a copy of the Power Point presentation for the Scoping Meeting and checklist based on appendix G of the CEQA guidelines. The scoping period ended on July 22, 2010. Staff did not receive any comments during the comment period for scoping. While the 2010 scoping meeting did include an additional phase of work, as described in section 1.2.1 of this Staff Report, the general scope and goals of the project has remained the same.

The proposed revisions to the DO objectives were scoped separately from the remainder of the proposed amendment. Two CEQA Scoping Meetings were held in the fall of 2008, one in Santa Rosa and one in Weaverville. A Scoping Document was presented at the meeting and public comments solicited both verbally and in writing. In the spring of 2009, a draft Staff Report was submitted for scientific peer review. The proposed approach was used to calculate a waterbody-specific objective (WSO) for DO in the mainstem Klamath River. The Regional Water Board adopted the WSO in March 2010. It was approved by the State Water Board, Office of Administrative Law, and USEPA, becoming effective in December 2010.

4.3 Analysis of Reasonable Alternatives to the Proposed Activity

Regional Water Board staff has identified four approaches (or alternatives) to fulfill the project objectives (i.e., update the water objectives for chemical constituents and DO, addition of a groundwater toxicity objective and provide clarity for the translation of

narrative objectives into numeric thresholds to be implemented in Regional Water Board orders). The purpose of this analysis is to determine if there is an alternative that would feasibly attain the basic project objectives of the rule or regulation, but would lessen, avoid, or eliminate any identified adverse environmental impacts.

The alternatives are compared on the basis of their ability to protect water quality and beneficial uses (i.e., their likelihood of success) and whether the approach is feasible, flexible and equitable. The four alternatives are summarized as follows:

1. No Action;
2. Establish numeric water quality objectives for all constituents of concern;
3. Establish narrative water quality objectives for all constituents of concern and a narrative translation policy to determine appropriate numeric thresholds to implement the narrative objectives; and,
4. Proposed project.

4.3.1 Alternative 1, No Action - No Change in Basin Plan Language or in Program Implementation

Under the "No Action" alternative, no amendment to the Basin Plan would occur and staff would continue to implement existing Regional and State Water Board programs, as in the past. Under this alternative, numeric water quality objectives for DO and numerous chemical constituents would remain outdated. Implementation of Porter-Cologne, State Water Board plans and policies, and the Regional Water Board's plans and policies would continue in the same manner as is now the case.

It should be noted that environmental impacts associated with the no project alternative are likely to be the same as the proposed project alternative. The proposed project alternative is essentially designed to make explicit in the Basin Plan the process by which the Regional Water Board already implements its authority under Porter-Cologne, including its obligations under the State Water Board's plans and policies and the Regional Water Board's plans and policies.

With respect to DO, the "no action" alternative is to retain the DO objectives as written in the Basin Plan without update or revision. The No Action Alternative would leave Table 3-1 unchanged, including background DO objectives developed based on grab sample data from the 1950s and 1960s. As an example, the background DO objectives would be retained for the Laguna de Santa Rosa, even given the results of water quality studies for DO demonstrating that natural conditions (in the absence of anthropogenic effects) result in periodic DO concentrations less than the given objectives. The life cycle DO objectives would continue to protect against acute effects. However, they would provide no protection against the chronic effects of DO stress, including reduced reproductive success, reduced growth, and increased susceptibility to disease. The background DO objectives

would continue to apply instead of life cycle DO objectives in those waterbodies listed in Table 3-1.

Pros:

- Allows re-direction of Basin Planning staff to begin/continue work on the next issue on Triennial Review Priority List.

Cons:

- The numeric chemical constituent objectives specified in the basin plan would often conflict with the numeric thresholds identified as appropriate through application of other more stringent objectives and policies.
- Does not address the scientific advances made in understanding the natural patterns and range of DO or the acute and chronic effects on beneficial uses.

4.3.2 Alternative 2, Adopt a Basin Plan Amendment that: 1) Updates the Chemical Constituents Objectives with the Current Numeric Values Title 22; 2) Adds New Numeric Groundwater Toxicity Objectives; and 3) Waterbody-Specific Objectives for DO

Under this alternative, the Basin Plan would be amended to include specific numeric objectives for DO, each chemical constituent, and each toxicant of concern. Tables 3-1 and 3-2 of the Basin Plan would be expanded to include all current primary and secondary MCL values and create a new table relevant to the toxicity of chemicals and watershed site - specific objectives (WSO) for DO. Each beneficial use would have relevant acute and chronic toxicity water quality objectives to be implemented as appropriate in Regional Water Board Orders.

Staff is not recommending this alternative because it would establish in the Basin Plan objectives which would soon become outdated, as chemical constituents and toxicity-based thresholds are modified as part of other state efforts and advances reported in the scientific literature. Otherwise keeping the Basin Plan up to date for chemical constituents would require significant staff time in amending the plan on a frequent basis. Additionally, it does not make wise use of resources which are already applied in developing MCLs and Public Health Goals (PHGs) through other state-funded efforts.

Pros:

- Broadly supports water quality protection.
- Provides waterbody-specific objectives and reduces the need to have a natural conditions clause.

Cons:

- Would require significant staff time to keep the Basin Plan updated with changes to MCLs and relevant toxicological information.

- Does not address the numeric values of chemicals constituents and toxic substances that are not specified in the Basin Plan.
- Developing SSOs for DO in each watershed would require a significant amount of state resources and would not likely be completed for decades.

4.3.3 Alternative 3, Adopt Basin Plan Amendment that Includes: 1) A Narrative Objectives for Groundwater Toxicity; 2) Updates the Chemical Constituents Objectives with the Current Numeric Values Title 22; 3) Updates DO Objectives; and 4) Includes a Narrative Water Quality Objective Translation Policy

Under this alternative, the Basin Plan would be amended to include narrative water quality objectives for DO, chemical constituents, and toxicity. In addition, the Basin Plan would be revised to include a narrative translation policy describing the process by which appropriate numeric thresholds are identified to implement the narrative objectives.

Pros:

- The incorporation of a narrative translation policy would improve the regulatory clarity and transparency, as compared to the no action alternative.

Cons:

- Creates another policy on top of the existing laws and regulations that would still need to be applied on case by case basis.
- Does not include specific numeric values for every constituent of concern and their potential acute or chronic effect thresholds on each beneficial use.

4.3.4 Alternative 4, Proposed Alternative: Adopt Basin Plan Amendment that Includes: 1) A Narrative Objectives for Groundwater Toxicity; 2) Prospectively Incorporates Current Numeric Values Listed in Title 22 as the Chemical Constituents Objective; 3) Revises the Aquatic Life DO Objectives; and 4) Includes Substantive Edits Clarifying the Implementation of Water Quality Objectives

Staff recommends adoption of this proposed alternative as a Basin Plan amendment because it provides the most regulatory clarity and transparency while also ensuring that objectives (and the numeric thresholds identified to implement them) are up-to-date and relevant. This alternative is a balance between discretion and precision, and provides flexibility, clarity and transparency.

This alternative includes the revision of the Basin Plan's DO objectives, as follows:

- Revision of the aquatic life DO objectives based on USEPA (1986) and other scientific literature as described in Section V.1.3;
- Elimination of the background DO objectives from Table 3-1 except for Humboldt Bay, Bodega Bay, and ocean waters.
- Inclusion of a "natural conditions" clause that allows for the calculation of background DO objectives based on 85% DO saturation during the dry season and 90% DO saturation during the wet season (based on natural stream temperatures) in those

waterbodies or reaches of waterbodies where natural conditions prevent the attainment of aquatic life DO objectives.

Pros:
- Updates the minimum objectives for chemical constituents.
- Saves staff basin planning resources by prospectively incorporating MCLs.
- Clearly establishes a water quality objective related to groundwater toxicity.
- Makes clear and transparent the process used to implement water quality objectives in Regional Water Board orders.
- Reduces the risk of erroneous listing of DO on the 303 (d) list due to outdated water quality objectives.

Cons:
- Does not include specific numeric values for every constituent of concern and their potential acute or chronic effect thresholds on each beneficial use.

4.4 Analysis of Compliance Measures, Potential Environmental Impacts, and Possible Mitigation Measures

What follows is an analysis of potential environmental impacts associated with the wide range of compliance measures which could potentially be used to comply with the proposed alternative, including updated chemical constituents objectives, groundwater toxicity objective, and updated DO objectives. The specific compliance measures and pollution controls necessary to comply with the proposed alternative will depend on a number of site-specific conditions and factors. The following examples are not meant to be exhaustive of the suitable suite of compliance measures, but rather provide a representative sample with the widest range to accommodate as many compliance scenarios as possible. The analysis addresses compliance measures to address chemical constituent and toxicity control (Section 4.4.1) separately from those to address DO compliance (Section 4.4.2). The potential environmental impacts associated with the identified compliance measures are evaluated together (Section 4.4.3).

<u>General Compliance Measures</u>

In addition to many of the specific compliance measures for soil and groundwater cleanup, wastewater treatment, and various DO compliance measures, the general compliance measures listed below are often interchangeable as mitigation measures for potentially adverse environmental impacts associated with specific project activities. For instance, in one case a health and safety plan may be a required element of a groundwater cleanup action. On the other hand, a health and safety plan could be a mitigation measure to address potential hazards associated with a waste water treatment plant operation or upgrade. Examples include:

- Air Quality Control Plans – Several soil and ground water remediation technologies can cause a release of particulate matter, emission, and gases that can produce

chronic or acute effects. Often these technologies are regulated via the local air quality management district. Plans should be developed in accordance with local provisions, standards and appropriate avoidance, minimization, and mitigation measures.

- Monitoring Well Installation and Sampling – Groundwater monitoring well installation is a common practice to assess the extent of constituents of concern and the effectiveness of specific treatment and/or remedial actions. Depending on the circumstance, the drilling and construction of a groundwater well for the purpose of gathering soil and groundwater data to characterize site conditions can be considered a compliance measure and mitigation measure.
- Onsite Storage Areas – Remediation and treatment facilities often require areas to store equipment and materials. Such facilities are often enclosed and/or locked for health and safety purposes.
- Traffic Control Plans – Subsurface contamination can migrate offsite encountering city streets and highways. Investigations and remedial actions often require traffic control plans to conduct investigation along or adjacent to city or state right-of-way.
- Health and Safety Plans – Project-specific health and safety plans that identify and address physical, chemical and biological hazards at site locations. Plans include emergency access, incident procedures, site safety officer points of contact, safety zones, level of personal protective equipment required to access sites, and location and route to nearest hospital facilities.
- Monitoring and Reporting **-** Public Resources Code, section 21081.6 and California Code of Regulations, title 14, section 15097requires a Mitigation Monitoring and Reporting Program (MMRP) to ensure that mitigation measures identified in an EIR or negative declaration are implemented to avoid significant environmental effects. The MMRP must be adaptable according to the context, in this case, a programmatic policy with a broad range of implementation actions. As explained in the Staff Report and findings below, projects that might be undertaken as a result of the Basin Plan Amendment would be subject to a project-level CEQA review conducted by the Regional Water Board or by another lead agency, which would entail project-specific identification and mitigation of any significant environmental effects. These projects would be subject to a project-specific MMRP. The Basin Plan Amendment does include monitoring and reporting elements appropriate for its programmatic scope, and the implementation of mitigation measures can be tracked by these mechanisms. The most appropriate reporting mechanism is through the program-specific requirements. Monitoring the implementation of mitigation measures is most fitting in a project specific program of implementation. This includes specific projects both within and outside of the Regional Water Boards authority. While monitoring is listed as a general compliance measure and a potential mitigation measure for many of the potential impacts listed below it is most accurate to describe monitoring as a means of evaluating the effectives of mitigation measures allowing feedback for adaptive management and minimization of adverse effects.

4.4.1 Analysis of Compliance Measures to Address Water Quality Objectives for Chemical Constituents and Toxicity in Surface Waters and Groundwaters

In-Situ Biological Remediation Compliance Measures

- Bioventing – The injection of air into unsaturated soils to increase oxygen and stimulate existing soil microorganisms promoting biodegradation.
- Bioreactor landfills – The recirculation of leachate in aerobic or anaerobic or hybrid systems to accelerate the degradation of solid waste.
- Enhanced Biodegradation – In-situ methods of soil and/or groundwater remediation using microorganisms to degrade organic contaminants in soil, groundwater sludge, and solids. In-situ methods include drilling borings or wells for injection and treatment.
- Phytoremediation – The use of plants to aide in the treatment and remediation of contaminated soil and groundwater. Plants can enhance the rhizoshpere (microbes in the soil), provide hydraulic controls, promote photo-degradation (the metabolism of contaminates with plant tissues), and phyto-volitization (plants uptake contaminated water and release breakdown products through their leaves.
- Natural Attenuation – Relies on the natural process to decrease or "attenuate" concentrations in soil and ground water. Usually involves site modeling to project the attenuation timeframe and continued monitoring to verify decreasing concentrations.

In-Situ Physical/Chemical Remediation Compliance Measures

- Chemical Oxidation - Chemical oxidation uses chemicals called "oxidants" to help change harmful contaminants into less toxic ones. When oxidants are added to contaminated soil and groundwater, a chemical reaction occurs that destroys contaminants and produces harmless byproducts. To treat soil and groundwater in situ, the oxidants are typically injected underground by pumping them into wells. The five major oxidants used for ISCO are permanganate, persulfate, hydrogen peroxide, ozone and ultraviolet (UV) radiation.
- Electrokinetic Separation - In-situ method used to separate heavy metals, radionuclides, and organic contaminant from saturated or unsatured soils, sludges, sediments and groundwater. Involves the use of electrodes and low voltage direct currents to transport ions and ion complexes to migrate and can be trapped/removed by electroplating, precipitation, pumping, or complexing with ion exchange resins.
- Fracturing – Environmental fracturing are techniques used that enhance or create openings in bedrock or soils with low porosity to help remediation action work more effectively. Fracturing methods can be conducted hydraulically using water and/or slurries or pneumatically using air or gas injections.
- Soil Flushing – Involves the use of a solution to promote the mobilization to remove contaminants from the soils. The solution can be injected or infiltrated and is usually captured for disposal or recirculated. Flushing solutions can be acidic, basic, chelating or complexing agents, cosolvents or surfactants. Once the solution is activated the solution and or contaminated groundwater can be captured and treated as

appropriate.

- Soil Vapor Extraction – SVE can remove contaminant vapors for treatment above ground. Typically used with air sparging wells to promote the volization and migration of vapors to be captured by applying a vacuum to soil vapor extraction wells which are plumbed to a system treat the vapors and gases.
- Air Sparging - The injection of air through sparge wells to promote degradation of organic contaminants. Volatilize organic chemicals to gases for extraction and treatment.
- Air Stripping - Air stripping uses either and air stripper or aeration tank to force air through contaminated water and evaporate VOCs. The most common type of air stripper is a packed-column air stripper, which is a tall tank filled with pieces of plastic, steel or ceramic packing material.
- Bioslurping – A combination of dewatering and vacuum to simultaneously recover free product and bioremediate the vadoze zone. It is used to improve free-product recovery and minimize the capture of contaminated groundwater.
- Directional Wells – Drilling techniques are used to position wells horizontally or at an angle to reach contaminants that are not accessible by direct vertical drilling. These wells can be used for monitoring or treatment purposes.
- Dual Phase Extraction – DPE or multi-phase extraction combines numerous combinations of technologies to address, free-product, contaminated groundwater and/or hydrocarbon vapors. Extracted liquids and vapors are treated and collected for disposal.
- Permeable Reactive Barriers / Treatment Walls – A wall created below ground out of a reactive material that will either trap contaminants or treat them as water flows through. Used a variety of reactive agents such as iron to chemicals treat groundwater plumes as they migrate.
- Thermal Treatment - The use of heat to volatilize organic chemicals to gases for extraction and treatment. Common methods include electrical resistance heating, steam enhanced extraction, and thermal conduction heating.
- Treatment Wells - Groundwater circulation wells provide a technique for remediation by creating a three-dimensional circulation patter of the groundwater. Groundwater is draw through and pumped through multiple screen sections promoting circulation of volitization of contaminants. Groundwater injection wells provide a conduit for a number of remedial technologies used to treat contamination.

<u>Ex-Situ Biological Remediation Compliance Measures</u>

- Biopiles - Ex-situ methods of soil remediation using micro-organisms to degrade organic contaminants in soil, sludge, and solids. Ex-situ methods include pumping and treating groundwater or excavating soil and placing in stockpiles or treatment cells.
- Composting – Contaminated soils is mixed with bulking agents and organic amendments such as wood chips, hay, manure and vegetable wastes to stimulate microbial activity to promote biodegradation.
- Land Farming – Contaminated soil, sediment or sludge is excavated and applied to a

containment unit (lined and/or berm) and periodically tilled or overturned to aerate waste.

- Slurry Phase – An aqueous slurry is created to keep solids suspended and microorganisms in contact with contaminated soils.
- Bioreactors – Contaminants in extracted groundwater are put into contact with microorganisms in attached or suspend growth biological reactors. Bioreactors degrade contaminates in water and are often a several year process. Also, used in conjunction with activated carbon.
- Constructed Wetlands – The principal components of wetlands including organic soils, microbial flora and fauna, algae and vascular plants are used to biodegrade contaminants through ion exchange, adsorption, and microbial oxidation. Most commonly used in wastewater treatment applications.

Ex-Situ Physical/Chemical Remediation Compliance Measures

- Chemical Reduction – In situ chemical reduction, or "ISCR," uses chemicals called "reducing agents" to help change contaminants into less toxic or less mobile forms. Common reducing agents include zero valent metals, which are metals in their pure form. The most common metal used in ISCR is zero valent iron (ZVI), which must be ground up into small granules for use in ISCR. Other common reducing agents include polysulfides, sodium dithionite, ferrous iron, and bimetallic materials, which are made up of two different metals. The most common bimetallic material used in ISCR is iron coated with a thin layer of palladium or silver.
- De-Chlorination Injection/Reductive Treatment – In-situ and ex-situ methods of soil and/or groundwater remediation for contaminants such as such as heavy metals. The use of reductants to induce chemical reactions either converting the contaminants to a non-toxic form and/or resulting in the stabilization or migration of contaminants to be contained or extracted.
- Dehalogenation - Used to treat contaminated soil by heating and adding reagents to achieve decomposition or partial volitization. These methods have been used successfully to treat SVOCs, pesticides and PCBs.
- Separation/Soil washing - Contaminates sorbed onto fine soil particles are separated from bulk soil in a water-based system. Wash water may then be augmented or adjusted to reduce pollutants and adjust pH levels. The soils and water are usually separated into fractions using gravity settling.
- Activated Carbon Treatment - Activated carbon treatment generally consists of one or more columns, tanks or drums filled with granular activated carbon (GAC). Contaminated water or vapors are usually pumped through a column from the top down, but upward flow is possible. As the contaminated water or air flows through the GAC, the contaminants sorb to the outer and inner surfaces of the granules.
- Advanced Oxidation Process/Chemical Oxidation Injection - Chemical oxidation uses chemicals called "oxidants" to help change harmful contaminants into less toxic ones. When oxidants are added to contaminated soil and groundwater, a chemical reaction occurs that destroys contaminants and produces harmless byproducts. To treat soil

and groundwater in situ, the oxidants are typically injected underground by pumping them into wells. The five major oxidants used for ISCO are permanganate, persulfate, hydrogen peroxide, ozone and ultraviolet (UV) radiation.

- Aeration/Air Sparging - Ex-situ methods of soil remediation include excavating contaminated soil and allowing contaminates to degrade in a stockpile or waste treatment cell. Additionally, ponds or tanks with air injections, fountains or paddlewheels can be used to aerate and treat contaminated groundwater.
- Air-Stripping Tower – Volatilize organic chemicals to gases for extraction and treatment. Air stripping uses either and air stripper or aeration tank to force air through contaminated water and evaporate VOCs. The most common type of air stripper is a packed-column air stripper, which is a tall tank filled with pieces of plastic, steel or ceramic packing material.
- Excavation/Dredging – Removal of contamination sources and/or contaminated soils, muds and slurries either for onsite storage and treatment or offsite treatment and disposal.
- Groundwater Pumping/Extraction – Extraction wells are often installed and used to remove groundwater or gases and/or vapors resulting from subsurface contamination. Various types of drill rigs are used to bore into the subsurface target area where an extraction well can be constructed for the purposed of removing contaminated soil and water.
- Ion Exchange/Electrodialysis –The use of materials such as zerovalent iron, or solvent-impregnated resins, and/or membrane technology to remove metals, other inorganic chemicals, and radionuclides from contaminated water. Advanced membrane technology use ion-exchange membranes to desalinate water. This results in a desalinated stream and high concentrated salt brine stream. Typically used in a wastewater treatment train, after coagulation/flocculation and clarifiers.
- Lime Softening – Often used to reduce the hardness of water and enhance the clarification prior to filtration. A USEPA best achievable technology for arsenic, barium, beryllium, chromium, copper, fluoride, lead mercury, cadmium, nickel, and radionuclides.
- Precipitation/Coagulation/Flocculation/Sedimentation – Precipitation is often used to remove metals prior to other treatment process. Coagulants and flocculation are used to increase particle size through aggregation leading to sedimentation or flocculant settling.
- Reverse Osmosis – The use of a semipermeable membrane and pressure to remove contaminants from water through a process of ion exclusion, which concentrates rejected ions into a brine or high strength waste stream.

<u>Ex-Situ Thermal Remediation Compliance Measures</u>

- Hot Gas – The process involves raising the temperature of the contaminated equipment or materials to 500 °F for a specified period of time. Gases from the influent are treated in an afterburner system to destroy all volatilized contaminants. This method reduces stockpiled wastes, but required subsequent disposal of

hazardous materials.

- Incineration – This process involves high temperatures ranging from 1,450 °F to 1,600 °F to volatilize and combust organics in hazardous wastes. Off gases usually require treatment. The most common types of incinerators include the circulating bed combustor, fluidized bed, infrared combustion, and rotary kilns.
- Pyrolysis – The chemical decomposition induced by organic material by heat in the absence or lack of oxygen. Used to transform hazardous organic materials into gaseous components, small amounts of liquid and a solid residue.
- Thermal Desorption – Wastes are heated to volatilize water and organic contaminants are volatilized.

Contamination Containment Compliance Measures

- Capping – Involves placing a cover (e.g., vegetation, clay, geomembrane, concrete or asphalt) over contamination to isolate contamination to prevent migration.
- Enhanced Capping/Evapotranspiration Covers –Like other caps over contaminated material; however, these are designed with specific soils and vegetation to promote capture and evaporation and transpiration through plants to help keep water from soaking into contaminated materials.
- Physical Barriers – Also known as slurry walls are used to contain soil and groundwater and divert contaminated flow from receptors like drinking water wells. These walls are tools to permanently control seepage and often used in conjunction with caps. Most slurry walls are constructed from soil, bentonite, geomembranes, and cement.
- Deep Well Injection – A method of drilling boreholes to the lower drinking water producing aquifer and backfilling them in a manner that prevents the vertical migration of contaminants. Often done with conductor casings and well packers to reduce the likelihood of cross contamination.

Wastewater Disinfection Compliance Measures

- Chlorine – A widely used disinfectant used to destroy target organisms (bacteria, protozoa, viruses, etc.) by oxidizing cellular material.
- Ozone – O_3 or Ozone gas is an unstable molecule used to disinfect water. A very strong oxidant which can be more effective than chlorine at removing harmful target organisms.
- Ultraviolet – Ultraviolet or US systems transfers electromagnetic energy from a mercury lamp to an organism's genetic material. UV radiation penetrated the cell wall and destroys its ability to reproduce.

Decentralized Systems Technology

- Aerobic Treatment – For locations not suitable for traditional septic systems (anaerobic) these systems can provide more suitable and higher level of treatment. Oxygen is transferred to the waste stream by diffused air, sparged turbine, or surface

entrainment devices.

- Control Panels – Sensors and controls that ensure proper operation of systems. Often fitted with alarms, telemetry, current sensing, and programmable controls these measures are sometimes need to ensure proper function of high risk or problematic systems.
- Filters – Various types of filters using mechanical screening, media filters like sand, textiles, peat, plastics, or even crushed glass can be used to increase surface area for biological process to take place and trap and treat the influent wastewater.
- Intermittent Sand Filters – Filter bends of graded granular material used to treat wastewater through intermittent dosing. Effluent percolates through the media and is transported through pluming for either further treatment or disposal.
- Low Pressure Pipe Systems – In location that are not ideal for traditional septic systems low pressure dosing systems have proven to be adequate alternatives. Level controls and/or timers are used for specific pumping sequences to appropriately dose the leach field or disposal area with treated wastewater.
- Mound Systems – For shallow groundwater or systems with unsuitable soils mounds can be constructed to overcome local site constraints. Usually pressures dosed sand filter mound systems are constructed above grade to enhance the treatment of native soils.
- Septic Systems – An onsite wastewater treatment system that usually includes gravity feed to an engineered below ground tank consisting of single of multiple chambers. Septic tanks have connecting piping to a leach field for additional treatment and disposal of wastewater. Septic systems can serve single or multiple households with the primary limiting factor being land availability and local soil conditions.

<u>Wastewater Treatment Compliance Measures</u>

- Aerated, Partial Mix Lagoons - Wastewater treatment methods include using ponds which circulate contaminated water via pumps, fountains, paddlewheels, jets, or subsurface compressed air bubbles. These ponds are effective at removing biological oxygen demand (BOD) and total suspended solids (TSS) in wastewater influent as a component of a multi-part treatment train.
- Advanced Ecologically Engineered System – Emerging technology that uses a series of tanks engineered in conjunctions with plants and microorganisms to mimic a natural wetland system. The treatment processes involve clarification, adsorption, nitrification, denitrification, volatilization and anaerobic decomposition.
- Anaerobic Lagoons – Deep ponds or impoundments that do not circulate or aerate wastewater and are used as a pretreatment method of industrial and municipal waste streams. Anaerobic lagoons are typically used to address high organic loads as part of a treatment train.
- Ammonia Stripping – The addition of lime or caustic to raise the pH of the wastewater until ammonium hydroxide ions are convert to ammonia gas which is the captured and treated by either cross-flow or countercurrent stripping towers.

- Ballasted Flocculation – High rate flocculation using additives to improve the settling of suspended solids. Used to enhance primary clarification or enhanced secondary clarification.
- Chemical Precipitation – Used for the removal of metal, inorganics, suspended solids, fats oils, greases and other organic substances (such as organophosphates) from wastewater. Through the use of polymers ion exchange is facilitated in wastewater. Dissolved compounds can then be removed by "softening" through the addition of line and ferrous sulfate. Once metals are rendered insoluble they precipitate and settle from the wastewater, while fats oils and greases float and are skimmed off.
- Dechlorination – The process of removing residual chlorine form treated wastewater. Sulfur dioxide, carbon adsorption, sodium bisulfite, sodium metabisulfite, and/or hydrogen peroxide are commonly used to minimize potentially toxic disinfection byproducts in effluent.
- Denitrifying Filters – The use of media filters, flow designs, a carbon source and microorganisms to remove nitrate from the wastewater.
- Electrodialysis– An advanced membrane technology that uses ion-exchange membranes to desalinate water. This results in a desalinated stream and high concentrated salt brine stream. Typically used in a wastewater treatment train, after coagulation/flocculation and clarifiers.
- Fixation/chemical reduction - In-situ and ex-situ methods of soil and/or groundwater remediation for contaminants such as such as heavy metals. The use of reductants to induce chemical reactions either converting the contaminants to a non-toxic form and/or resulting in the stabilization or migration of contaminants to be contained or extracted.
- Facultative Lagoons – Waste stabilization ponds that are stratified with aerobic and anaerobic layers. These lagoons/ponds can be flow controlled and seasonally adjusted to treat raw, screened or primary settled wastewater.
- Free Water Surface Wetlands - Wetland systems where surface water is exposed to the atmosphere. Treated effluent flows through a constructed vegetated soil surface for advanced wastewater treatment or tertiary polishing. Oxidation and adsorption of total suspended solids, metals and complex organics can occur and be adsorbed by soils, plants and consumed by microorganisms within the wetland.
- Granular Activated Carbon Absorption & Regeneration - Activated carbon treatment generally consists of one or more columns, tanks or drums filled with granular activated carbon (GAC). Wastewater is usually pumped through a column from the top down, but upward flow is possible. As the contaminated water or air flows through the GAC, the contaminants sorb to the outer and inner surfaces of the granules. Generally found to be effective in treating soluble organic and inorganic compounds.
- Green Sand Filtration – Commonly known as New Jersey greensand, or glauconite, is used as a media to filter water to remove iron and manganese from drinking water.
- Ion Exchange/Electrodialysis –The use of materials such as zerovalent iron, or solvent-impregnated resins, and/or membrane technology to remove metals, other

inorganic chemicals, and radionuclides from contaminated water. Advanced membrane technology use ion-exchange membranes to desalinate water. This results in a desalinated stream and high concentrated salt brine stream. Typically used in a waste water treatment train, after coagulation/flocculation and clarifiers.

- Membrane Bioreactors – Commonly used for secondary treatment of wastewater with the use of microorganisms. A microfiltration membrane is used in place of secondary clarifiers and sand filters. Typically used on small systems or industrial or commercial applications.
- Oxidation Ditches – A modified activated sludge biological treatment process using long solid retention times using a single or multiple ditches sometimes in combination with aerators to provide additional secondary treatment.
- Package Plants – Pre-manufactured treatment facilities use to treat small communities or individual properties with typical flows between 0002 MGD and 0.5 MGD. Common types of plants include extended aeration plans, sequence batch reactors, oxidation ditched, contact stabilization plants, rotating biological contactors, and physical/chemical process.
- Land Application – Treated wastewater is applied to land through infiltration ponds, flood basins, sprinklers, or drip systems. Native soils play additional roles in adsorption and microbiological treatment of wastewater. The application can be used in combination with additional hydraulic controls such as underdrains and/or wells. Additionally, treated water can be used at agronomic rates and beneficially reused for crop irrigation.
- Precipitation/Coagulation/Flocculation/Sedimentation – Precipitation is often used to remove metals prior to other treatment process. Coagulants and flocculation are used to increase particle size through aggregation leading to sedimentation or flocculent settling.
- Rock Media Polishing Filter For Lagoons - Rock filters are used to remove algae from lagoon or pond effluents prior to discharge.
- Reverse Osmosis – The use of a semipermeable membrane and pressure to remove contaminants from water through a process of ion exclusion, which concentrates rejected ions into a brine or high strength waste stream.
- Side Stream Nutrient Removal – Nutrient loads from rejected wastewater (side stream) are often reintroduced into the treatment system accounting for 15 to 30% of the total load. Separating out the waste streams can improve the final effluent nutrient concentrations.

Other Treatments/Actions Compliance Measures

- Offsite Disposal - Contaminated soils, sludge, septage and contaminated groundwater removed from a site through excavation or pumping must be treated for onsite reuse or disposed of. Soil is often excavated separated and treated based on the concentration of contamination. Often, hazardous or near hazardous levels will be transported offsite for treatment or disposal. Depending on the locality of a site, treated groundwater may be disposed of into a sewer system, storm drain, to land or

surface water.

5.4.2 Analysis of Compliance Measures to Address the Dissolved Oxygen Water Quality Objective in Surface Waters

The conceptual model for DO (Appendix D, Figure 1) specifically identifies the following activities as influencing the presence of DO in an aquatic system: agricultural practices, forestry practices, fossil fuel extraction and refinement practices, other mining practices, construction practices, residential and commercial practices, recreational practices, and industrial practices. These activities have the potential to act as sources of: fire ash and smoke, animal wastes, mining wastes, septic system leachate, landfill leachate, fertilizers, vehicle emissions, industrial emissions, sewage treatment plant effluent, industrial effluent, storm water discharge, and other historic or existing sources. In addition, these activities have the potential to alter environmental conditions in such way as to alter the natural cycle of DO availability. For example, the installation of impoundments, alteration of land cover, alteration of the stream channel, increase in temperature, or increase in sediment delivery can impact the functioning of DO in an aquatic system. Additionally, proactive restoration measures such as increasing the availability of channel forming material (e.g., large woody debris) in the stream channel, riparian zone, and floodplain are crucial to aquatic ecosystem function and recovery.

As such, the conceptual model illustrates the importance of developing management measures designed to reduce the threat of:

- Discharge of anthropogenic sources of nutrients, organic matter and water/wastewater low in DO, including the discharge of agricultural return flows;
- Discharge of warm water to a waterbody, including the discharge of agricultural return flows;
- Anthropogenic sources of erosion and sediment delivery;
- Direct alteration of the stream channel, such as through gravel mining;
- Disturbance to wetlands, the flood plain and riparian zone;
- Anthropogenic alteration to the natural pattern and range of flows, including storm water management, groundwater protection, and control of water impoundment and withdrawal; and
- Loss or alteration (e.g., reduction in flow or increase in temperature) of cold water spring.

It further illustrates the importance of developing management measures designed to control vehicle and industrial emissions. This task, however, is out of the range of the Regional Water Board's authority.

<u>Conventional Wastewater Treatment</u>

- Primary treatment (e.g., screening, grit removal, and primary sedimentation)
- Secondary treatment (e.g., attached growth process or suspended growth process of biological treatment)

- Advanced treatment (e.g., nitrification/denitrification, coagulation-sedimentation, carbon adsorption)
- Disinfection (e.g., chlorination/declorination, ozone)

Aquatic Ecosystem Restoration

- Stabilize stream crossings to provide controlled access across a stream for livestock and farm machinery.
- Stream or river bank revegetation to increase shade in accordance with site potential.
- In-stream gravel augmentation.
- Large woody debris/habitat enhancement projects.
- Stream or river bank stabilization with native vegetation or other bioengineering techniques, the primary purpose of which is to reduce or eliminate erosion and sedimentation and support site potential shade.
- Culvert replacement conducted in accordance with published guidelines of the Department of Fish and Wildlife or National Marine Fisheries, the primary purpose of which is to improve habitat, provide shade, reduce sedimentation, or provide access to areas of thermal refugia.
- Re-establish native wetland and upland vegetation.
- Recreate historic channels.
- Restore historic oxbow channels to allow continuous flow.
- Breach lakeshore levees to create diverse habitat features.
- Lower lake levees to create riparian fringe habitat.

Oxygenation of stored water/wastewater/tailwater

- Specific to wastewater holding ponds, treatment methods include using ponds which circulate contaminated water via pumps, fountains, paddlewheels, jets, or subsurface compressed air bubbles. These ponds are effective at removing BOD and TSS in wastewater influent as a component of a multi-part treatment train
- Application of fine bubbles
    - Using unconfined fine bubble diffuser
    - Using unconfined and diffuse bubble curtain
- Specific to a reservoir, use of a bubble-free system in which a pressurized container placed at the bottom of the reservoir is used to mix water with gas and the mixture is dispersed over the sediments. The system is operated as soon as monitoring indicates that dissolved oxygen levels in the hypolimnion are starting to drop (early spring) and through the summer/fall.
- Oxygen supply facilities would include a liquid oxygen storage tank, vaporizers, and trucked-in oxygen to be used at locations midway along the reservoirs.
- Small onsite oxygen generators might also be used to supply oxygen near the dams

Nutrient Management

The goal of proper nutrient management is "to minimize nutrient losses from agricultural lands occurring by edge-of-field runoff and by leaching from the root zone" (USEPA 2003). USEPA (2003) describes four important elements to successful nutrient management: 1) determine realistic yield goals, preferably on a field-by-field basis, 2) account for available nutrients from all sources before making supplemental applications, 3) synchronize nutrient applications with crop needs (nitrogen is needed most during active crop growth and may be lost at other times), and 4) reduce excessive soil-phosphorus levels by balancing phosphorus inputs and outputs. Where nutrients are in the dissolved phase, source reduction and reduction of water runoff or leaching are important goals. For nutrients adsorbed to soil particles, the prevention and control of soil erosion is important.

- Monitor soil, irrigation water, and residual plant matter for nutrient content.
- Time fertilizer application to be consistent with plant needs to avoid runoff of excess nutrients to surface waters or leaching of excess nutrients to groundwater.
- Use appropriately sized vegetated buffers to prevent discharge of nutrients to surface waters.

Pesticide Management

The goal of proper pesticide management is to reduce contamination of groundwater and surface water from pesticides by using less pesticide (quantity), less toxic (toxicity) pesticides, and applying pesticides in a manner that reduces the risk of runoff, leaching or air-borne transport. With respect to the chemical constituents, toxicity and DO, the application of herbicides is of most relevance. For example, herbicides applied to drainage channels or applied in such a manner as to risk overspray to a water body or riparian zone, could result in an increased risk of organic matter loading as treated plants die and their organic matter is available for delivery to a stream. Similarly, the spraying of herbicides in a riparian zone or overspray from adjacent fields could result in the temporary loss or harm to riparian shade. Additionally, over application of pesticides has the potential to adversely impact both human and aquatic life through adsorption and ingestion if pesticide levels accumulate in drinking water supplies or recreational areas.

- Inventory pest problems.
- Evaluate the soil and physical characteristics of the site, including locations for safe mixing, loading, and storage of pesticides.
- Use integrated pest management strategies that apply pesticides only to the area of need, only when there is an economic benefit to the grower, and at times when runoff losses are least likely, including losses of organic matter from dead plant material.
- Consider the persistence, toxicity, runoff potential, and leaching potential of pesticide products.
- Periodically calibrate pesticide application equipment.
- Use anti-backflow devices on water supply hoses, and other mixing/loading practices designed to reduce the risk of runoff and spills.

Restore and Maintain Site-Specific Potential Effective Shade

- Increase riparian and in-channel tree canopy retention for surface waters to support beneficial uses.
- Limit development and harvest actions in riparian areas to attain site potential shade.
- Develop a grazing management plan for upland and riparian management.
- Calculate the timing and number of livestock that can be accommodated while maintaining adequate vegetative cover, stream corridor integrity, and water resources.
- Establish native or introduced forage species (grasses, forbs, legumes, shrubs, and trees) through pasture, field, orchard and rangeland planting.
- Implement the controlled harvest of vegetation with grazing or browsing animals to achieve a specific objective.
- Exclude animals, people, or vehicles from an area to protect, maintain, or improve the quantity and quality of riparian vegetation.
- Construct animal trails to provide movement of livestock through difficult or ecologically sensitive terrain.
- Stabilize stream crossings to provide controlled access across a stream for livestock and farm machinery.
- Plant vegetation to increase shade in accordance with site potential.

Variable Outlet Structure

A variable outlet structure allows the operator to draw water from various depths in the reservoir. This flexibility allows the operator to respond to water quality conditions of the reservoir and the water quality needs of the river downstream so as to release water that most closely meets the overall environmental objectives.

- Install coffer dam
- Install necessary infrastructure for outlet

Erosion and Sediment Control

Structural erosion and sediment control compliance measures:

- Soil conservation cover straw cover, bonded fiber matrix, grass seeding, temporary plastic cover, residue tillage, heavy use area protection, strip cropping.
- Silt fence, straw waddle, straw bale, gravel check dam, gravel bag berm, stock pile cover.
- Sediment control basin, pond, embankment pond.
- Riparian buffer/filter strip, grassed waterway/bioswale.
- Active sediment treatment system.
- Culverts, stream crossings, water diversions, bridges.
- Bench contouring, contour farming, terrace, vegetated windbreak/hedgerow planting.
- Exclusionary fences.
- Micro-irrigation systems.
- Lined irrigation channels.

- Rock slope protection, lined waterway/outlet, road/trail access control, underground outlet, vertical drain.
- Road/trail landing closures/treatment, forest trails and landings.
- Slide stabilization, soil stabilization or fill and cut slopes, removal of unstable fill.
- Low impact development (LID) to maintain the predevelopment hydrograph to sustain site runoff volume and velocity to attain sediment and water discharge equilibrium within streams.
- In-stream bioengineering.
- In-stream and riparian planting.
- Stream bank/shoreline protection.
- Road surface materials, paving, chip sealing, rocking, dust abatement. Establish native or introduced forage species (grasses, forbs, legumes, shrubs, and trees) through pasture, field, orchard and rangeland planting.
- Exclude animals, people, or vehicles from an area to protect, maintain, or improve the quantity and quality of riparian vegetation.
- Construct animal trails to provide movement of livestock through difficult or ecologically sensitive terrain.
- Stabilize stream crossings to provide controlled access across a stream for livestock and farm machinery.

Non-structural erosion and sediment control compliance measures:

- Dry weather construction or harvest scheduling.
- Inventory excessive sediment delivery sites, prioritize sites by threat to water quality, design and plan remediation, track and report remediation implementation success.
- Road drainage design, disconnect road drainage from watercourses (drain to hill slopes), install drainage structures at intervals to prevent erosion of the inboard ditch or gull formation at the hill slope outfall, outslope roads.
- Timing and intensity of road use.
- Proximity of roads to watercourses.
- Proximity of roads to unstable or landslide prone areas.
- Develop a grazing management plan for upland and riparian management.
- Calculate the number of livestock that can be maintained while maintaining adequate vegetative cover, stream corridor integrity, and water resources.

<u>Tailwater and Surface Impoundments</u>
Structural compliance measures:

- Pond, embankment pond.
- Riparian buffer/filter strip, grassed waterway/bioswale.
- Lining of an irrigation channel.
- Installation of a pipeline in lieu of an uncovered channel.
- Install surface drainage field ditch to collect excess water.
- Minimize discharge from edge of fields.

- Construct tailwater management system.
    - Construction of a reservoir and pumping facilities.
- Land leveling to prevent discharge from field edges to surface waters.
- Construct off-stream retention ponds for evaporating and percolating tailwater.
- Control structures for irrigation.
- Micro-irrigation systems.
- Dam removal.
- Bypass flow structures.
- Aeration systems.

Non-structural BMPs/compliance measures:

- Irrigation management plans to operate the irrigation system so that the timing and amount of irrigation water applied matches crop needs.

Preserving Cold Water Resources

- Avoid of areas of known thermal refugia during critical time for fish.
- Control of erosion and sediment discharges to areas of known thermal refugia.
- Remove fish passage barriers to areas of known thermal refugia.
- Conduct streambank restoration and riparian revegetation to areas of known thermal refugia.
- Construct riparian fencing to preserve areas of known thermal refugia
- Modify and/or remove on-stream storage facilities and dams which influence identified cold water resources.
- Construct new or modify off-stream storage facilities to replace on-stream facilities affecting cold water resources.
- Install and operate groundwater wells at a location with little or no influence over the flows associated with a cold water resource.
- Modify the operation and timing of groundwater, surface water, or riparian right water extraction.
- Rely on alternative water sources and conservation efforts.
- Construct and/or modify water transfer, irrigation and/or irrigation water management facilities to improve water use efficiency.
- Enhanced aquifer recharge (i.e., ASR).

Maintain Stream Flows that Support Beneficial Uses

- Construct, modify and/or remove on-stream storage facilities and dams.
- Construct new or modify off-stream storage facilities.
- Install and operate groundwater wells.
- Modify the operation and timing of groundwater, surface water, or riparian right water extraction.
- Rely on alternative water sources and conservation efforts.
- Construct and/or modify water transfer, irrigation and/or irrigation water

management facilities.
- Enhanced infiltration of groundwater (i.e., ASR)

Source Controls

Source controls are accomplished through existing local, state and federal authorities and includes a wide range of potential actions such as TMDLs, best management practices, the storm water programs, point source treatment controls, safe medicine disposal programs and pretreatment programs. It is not possible to evaluate the environmental effects of source control per se; one must evaluate the specific source control measure on a site-specific basis. It is not reasonably feasible at this time to evaluate the environmental effects of these hypothetical source control projects or mitigation measures for such hypothetical actions.

While adverse impacts are a possible consequence of source control measures for some sites, these impacts may be minimized or avoided by the implementation of a watershed management approach that balances the potential impacts (and cost effectiveness) of correcting a contaminated site or preventing high strength wastes from overloading treatment facilities or systems. The watershed management approach should involve point and nonpoint dischargers in addressing pollution prevention and remediation. Consequently, the environmental impact of source control efforts that result from a watershed management effort should be analyzed on a site-specific basis once the sites have been selected, and the function and general designs of the actions or facilities have been determined.

Watershed management is actually a process, rather than a regulatory requirement, and it is not possible to evaluate the physical environmental effects of such a process. Compared to the more traditional programmatic, regulatory approach to water management the watershed approach looks at all types of pollution and all sources of pollution. In a collaborative, stewardship effort, local interests are engaged with state and federal interests, and land managers to work with water managers to solve complex resource management problems. The purpose of watershed management is variously viewed as (1) a method for increasing participation at the local level in water quality protection, (2) an approach to reducing the impact of nonpoint sources, (3) a strategy for integrating management of all components of aquatic ecosystems, and (4) a process for optimizing the cost effectiveness of a number of point and nonpoint source control efforts.

Watershed management is not a new centralized program that replaces existing programs. The significant advantage of a watershed management approach is it encourages a collaborative process where diverse interests (i.e., individuals, landowners, growers, municipal agencies, industries, environmental groups and agencies) can work in conjunction with the State Water Board and Regional Water Board staff to develop a consensus on approaches for addressing water quality problems. Further, watershed

management provides a mechanism for considering social and economic interests in the context of solving water quality problems.

Taking a comprehensive approach to addressing pollution problems where point and nonpoint source pollution is considered together provides an opportunity to minimize environmental impacts of future pollutant reductions and consider cost-effectiveness together. It is impossible to predict the outcome of this combined process before it is completed. The potential impacts and mitigation depend on future decisions of watershed groups and the Regional Water Board.

4.4.3 Potential Environmental Impacts and Mitigation Measures Associated with Compliance Measures to Address Chemical Constituents, Dissolved Oxygen and Toxicity Water Quality Objectives

As noted in Chapter 2 of this Staff Report water quality objectives already exist for chemical constituents and DO for surface water and for groundwater. Additionally, a water quality objective for toxicity exists for surface water. It is acknowledged that the proposed Basin Plan amendment would remove existing numeric objectives and replace them, in some cases, with more stringent objectives with potential for those objectives to become even more restrictive as MCLs are modified in the future. Through the application of footnote 2 to the existing Table 3-2 of the Basin Plan, however, altered MCLs and other more stringent requirements are already applied. So in reality, the only truly new objective is the proposed groundwater toxicity objective. This point is highly relevant to an environmental impact analysis as the compliance measures used to address groundwater toxicity in most cases already exist and are being implemented throughout the North Coast Region.

It should be reiterated that the existing regulatory framework uses natural background conditions as the applicable water quality objective in actual and potential impacts to beneficial uses. In turn it can be debated as to whether or not a groundwater toxicity objective will result in numeric values beyond what already exists within the Regional Water Board current authorities. See Figure 3-1 for an illustration of this point. Nevertheless, staff has developed an analysis of the potential adverse impacts to the environment from compliance measures for groundwater and surface water chemical constituents and toxicity to eliminate any doubt of CEQA compliance. This chapter also includes analysis of potential adverse impacts to the environment from compliance measures associated with the proposed DO objective.

The resources that may be adversely affected by the reasonably foreseeable compliance measures are protected by a number of existing regulations and agency policies, as well as policy-level mitigation measures incorporated in this Staff Report. Based on the regulatory requirements to protect the environment at the project level and the policy-level mitigation measures identified, persons implementing remediation will take a number of steps to ensure that potentially significant environmental impacts are avoided, minimized and/or mitigated. Table 5-1 presents the potential resources that could be adversely affected by

compliance measures as a result of the proposed WQO Update Amendment, as well as mitigation measures to reduce the level of significance.

The policy-level mitigation measures contained in this Staff Report differ from future project-specific mitigation measures in that they address potential adverse impacts on a broad and generic level. In this regard, they help direct how and when project-specific measures may be needed to avoid or mitigate potential impacts, but they do not replace the need for project-specific environmental review or mitigation measures.

Many of the policy-level mitigation measures discussed in this document are restatements of existing federal and/or state laws and policies. Project proponents will evaluate proposed remediation plans consistent with these federal and state requirements (e.g., CEQA, Clean Water Act, Porter-Cologne Water Quality Control Act, Endangered Species Act, etc.). The inclusion and coordination of these measures as part of compliance measures implementation should help to minimize adverse environmental effects.

The categories of resources that the Regional Water Board has identified as potentially being impacted by the implementation of compliance measures include:[7]

- Aesthetics;
- Agriculture;
- Air quality;
- Biological resources;
- Cultural resources;
- Geology and soils;
- Hazards and hazardous materials;
- Hydrology and water quality;
- Land use / planning;
- Noise;
- Public Services;
- Transportation/traffic; and
- Utilities and service systems.

Aesthetics

- Decreased views or unsightly presence in a scenic vista due to the installation of additional mitigation or remediation equipment or associated material storage necessary to cleanup spills, unauthorized releases, treat wastewater, physically address DO.
- Unsightly views of additional wastewater treatment ponds, waste management/treatment units, structural oxygenation facilities.

[7] See CEQA Checklist (Section 5.5.2)

- Potential glare from ponds or unsightly water facilities.
- Decreased scenic views of waterbodies through the retention of vegetation.

Possible Mitigation Measures

- AesMM-1: Building storage facility structures or fences to contain equipment or materials.
- AesMM-2: Proper siting, constructing berms or excess freeboard around the perimeter of a ponds or waste management unit.
- AesMM-3: Planting vegetation such as native trees, grasses, and forbs.

Agriculture

- Potential conflict with or conversion of prime agricultural land or land subject to the Williamson Act from implementing grazing restrictions, riparian buffers, or riparian restoration.
- Municipal, domestic, agricultural and industrial water supply could be impacted by certain restrictions on the extraction of water from riparian areas or areas of known thermal refugia.
- Switching from surface water diversions to groundwater pumping could lower water table, reduce soil moisture, contribute to land subsidence and reduce aquifer storage capability.
- Regulation on water use could lead to the conversion of agricultural lands.

Possible Mitigation Measures

- AGRMM-1: Coordination between project proponents, Regional Water Board staff and other local, state and federal agencies to achieve site-specific potential effective shade, nutrient load reductions, areas of thermal refugia and attempt to ensure the preservation of agricultural lands.

Air Quality

- Construction-related emissions could include exhaust, fugitive dusts, toxic pollutants and particulate matter (PM10 and PM2.5) from construction equipment and fugitive dust from land clearing, earthmoving, movement of vehicles, and wind erosion of exposed soil during reservoir construction or removal, stream and/or riparian restoration.
- Additional source control treatment measure upgrades for publicly owned treatment works or soil, water or vapor remediation systems could result in an increase in greenhouse gas emissions due to increased power consumption.
- Potential for increased odors from excavation and exposure of contaminated soil, slurry, or sludge.
- Potential odors from stagnant water in sediment basins or ponds.
- Potential byproducts from reducing agents to treat soil and/or groundwater include airborne hydrogen sulfide, vinyl chloride, methane which can

produce nuisance or toxicity.
- Potential increase in emissions from transportation of soil and groundwater for offsite disposal.
- Electrodialysis produces hazardous gasses, such as chlorine, hydrogen, and hydrogen sulfide.
- Extended operation and maintenance of remedial action facilities.
- Thermal destruction incinerators produce off-gas that requires treatment by an air pollution-control system to remove particulates and neutralize and remove acid gases (e.g., HCl, NO_x, and SO_x).
- Alternative water supplies or increased pumping could result in long-term increase in greenhouse gases.

Possible Mitigation Measures
- AQMM-1:Air Quality Control Plans
  - Monitoring and Reporting
  - Dust control
  - Avoid days of poor air quality
  - Monitor levels and cease work prior to exceeding standards
  - Retrofit equipment
  - Use low emissions vehicles when possible
  - Schedule work to reduce the use of high emission vehicles.
  - Contingency Plans for AQ Violations
- AQMM-2: Particulate matter and gas removal systems
  - Baghouses, scrubbers, and wet electrostatic precipitators; packed-bed scrubbers and spray driers.

Biological Resources
- Installation or expansion of remediation or treatment facilities and/or aquatic ecosystem restoration can directly and indirectly impact species through habitat modification or by exceeding water quality objectives.
- The use of phytoremediation could result in the transfer of contaminants across media from soil and water to air.
- The use of phytoremediation could result in bioaccumulation of toxic compounds if primary producing organisms became prey for threatened or endangered species.
- Risk of introducing invasive species thorough pasture, hay and rangeland planting and management.
- Risk of conflict between site potential shade and requirements of sensitive flora or fauna.
- Operations of aeration systems for DO have the potential to supersaturate conditions and lead to accelerated mortality rates of salmoninds and other sensitive species.
- Short-term construction, stream dewatering or diversions, turbidity

discharges from construction actives or in-stream dam removal, stream and/or riparian restoration.
- Several species of fauna (e.g., snakes, fish, salamanders, and birds) have been entrapped or tangled in erosion control products such as the plastic casing covering straw waddles, or from the monofilament fibers from silt fences that are either in place on active.
- Loss of wetlands habitat from repair of leaky conveyance systems or alteration of irrigation practices.
- Switching from on-stream storage facilities to springs, seeps or groundwater as potential water sources could reduce the input of groundwater to surface waters and could results in impacts to areas of thermal refugia.
- Loss of critical habitat from sediment discharges.
- Loss of warm water habit for non-native species.
- Reduction in surface flows through groundwater extraction or increased reliance on riparian rights could degrade riparian and special status species habitat.

Possible Mitigation Measures
- BRMM-1: Consult the applicable state and federal resource protection agencies
- BRMM-2: Delineate and avoid any project specific environmental sensitive areas.
- BRMM-3: Identify species-specific work windows to avoid contact or disturbances.
- BRMM-4: Compensatory mitigation to create, replace, or restore filled or modified waters of the U.S. (streams and wetlands).
- BRMM-5: Remedial action plans proposing phytoremediation would need to evaluate the potential for bioaccumulation of toxic compounds and select plans species that will not become primary producers in the food chain.
- BRMM-6: Use certified weed-free grass and seed mix to prevent the introduction of invasive species.
- BRMM-*7:* Select appropriate or alternate structural BMPs such as bio-degradable, synthetic free or earthen material BMPs. Implement non-structural BMPs such as scheduling, proper design and the removal of temporary BMPs for erosion and sediment controls after stabilization and or project completion.
- BRMM-8: Developing species relocation plans or interpreting natural site vegetative conditions to include sensitive flora.
- BRMM-9: Water drafting protocols
    - Consult CA Fish and Wildlife
    - Consult SWRCB – Water Rights
    - Use water diversion fish screens
    - Velocity dissipaters

        - Habitat surveys
        - Stream buffers
    - AQMM-1: Air Quality Control Plans
        - Monitoring and Reporting
        - Contingency Plans for AQ Violations
    - H/WQMM-1: Develop storm water pollution prevent plans.
    - H/WQMM-2: Water Quality Monitoring
    - H/WQMM-3: Develop project-specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and onsite and nearby structures into account.
    - H/WQMM-4: Implement flow rate modeling, monitoring, prohibitions and restrictions within specific Regional Water Board permits and orders.
    - H/WQMM-5: Plant native vegetation that has evolved with the natural environment. Allow for the removal or thinning of upland vegetation that has high evapotranspiration rates and increases fire risks.

Cultural Resources

- Construction disturbance from earth moving associated with riparian restoration, installation of soil/groundwater remediation facilities, waste water treatment facility upgrades or expansions, monitoring well installations, excavations, ponds and lagoon construction, and physical barriers to contain contamination.
- Construction disturbance from earth moving associated with implementation of aquatic ecosystem restoration erosion and sediment controls.
- Construction disturbance from earth moving associated with measures to address tailwater, surface water impoundments, preservation of cold water resources, and measures to restore and maintain stream flows have the potential to impact culturally and historically significant sites.

Possible Mitigation Measures

- CRMM-1: Consult with Tribes, historical societies, federal, state and local agencies regarding location of cultural resources prior to use of heavy equipment in areas with known or suspected cultural resources. Projects subject to the jurisdiction of the Water Boards will be required to comply with Public Resource Code section 21159. This is expected to ensure the implementation of necessary project-specific actions to avoid, minimize and mitigate any impacts to historical, archaeological, and paleontological resources or site, or unique geologic features. All future actions must comply with the CEQA process and requirements for tribal consultation provided by Senate Bill 18 (SB 18) (State 2004, Ch 905) and Government Code section 65252.

Geology and Soils

- Implementation of compliance measures such as wells, ponds, trenches, excavations and other treatment facility expansions that involve construction may result in temporary ground disturbances that cause erosion.
- Soil excavation and trenching could result in erosion or soil collapse.
- Potential soil erosion from disturbed areas associated with stream stabilization, stream bank revegetation, culvert replacement, stream crossing construction, large woody debris placement.
- Construction activities or poorly designed facilities could result in short-term and long-term erosion, and could result in soils compaction reducing soil moisture and biological functions.

Possible Mitigation Measures

- H/WQMM-1: Develop storm water pollution prevent plans.
- GSMM-1: Include erosion control measures in facility pollution prevent plans, remedial action plans, or site health and safety plans.
- H/WQMM-3: Develop project-specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and onsite and nearby structures into account.

Hazards and Hazardous Materials

- Accidental spill or release of materials which have been removed from soil and or groundwater though a remediation actions, wastewater treatment facilities or from the construction of compliance measures.
- Natural attenuation if not monitored correctly could result allow the migration of hazardous substances.
- In-situ and ex-situ physical, chemical and thermal remediation or treatments, by design, have the potential to create byproducts or mobilize pollutants in air, soil, and water.
- Physical, chemical and biological treatment of wastewater has the potential to create byproducts or mobilize pollutants in air and water.
- Increased amounts of compressed oxygen or compressors that may require fuels to operated.
- Construction and operation of reservoir or stream aeration structures.

Possible Mitigation Measures

- H/WQMM-1: Storm Water Pollution Prevent Plans
- H/WQMM-2: Water Quality Monitoring
- H/WQMM-3: Develop project-specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and onsite and nearby structures into account.
- AQMM-1: Air Quality Control Plans
    - Monitoring and Reporting
    - Contingency Plans for AQ Violations

- HHMMM-1: Project-specific health and safety plans

Hydrology/Water Quality

- Soil excavations, compost operations or land farming could result in erosion, sedimentation of nearby waters.
- During the reductive de-chlorination process, metals, such as arsenic, manganese and antimony, may be mobilized in the subsurface.
- PCE is reductively de-chlorinated to Trichloroethylene (TCE), cis- and trans-1,2-DCE and vinyl chloride (VC).
- Ozone injection can cause chromium III to turn into a more toxic and bioavailable chromium VI.
- Fracturing hydraulically separate zones could lead to cross contamination of uncontaminated aquifers, water bearing zones, or nearby surface waters.
- Pump and treat systems could result in a lowering of the groundwater table or an alteration of hydrology by impeding the natural groundwater gradient.
- Pump and treat systems could alter a site's hydrology and adversely affect nearby streams, riparian areas or wetlands.
- Pump and treat systems could result in the alteration of nearby stream hydrology adding to the total flow in the stream.
- Improper or partial application of wastewater treatment methods/chemicals could have adverse effects on effluent water quality.
- Land application of wastewater could result in groundwater quality impacts through the accumulation of organics, salts, or precipitation of naturally occurring metals in soils.
- Reduction in stream flows due to the increase in evapotranspiration from increased riparian tree retention. Temporary sediment discharges from construction and/or restoration activities.
- Temporary sediment discharges that exceed water quality objectives from construction and/or restoration activities.
- Excessive use of rip-rap or stream stabilization structures intended to beneficially affect flow could alter conditions downstream.
- Work within and adjacent to waters increases the risk of leaking equipment or hazardous material spills, short-term turbidity increases and/or discharges of settable solids.
- Breaching lakeshore levees to create diverse habitat features and lower lake levees to create riparian fringe habitat has the potential to adversely affect hydrology and natural flow patterns.
- Operations of aeration systems for DO have the potential to supersaturate conditions, exceed water quality standards and lead to accelerated mortality rates of salmoninds and other sensitive species.
- Decrease stream flows and/or aquifer storage from dust abatement.
- Alterations of natural hydrology and increases in stream temperatures by

concentrating or redirecting road runoff.
- Increased risk of soil or groundwater contamination with concentrated minerals, salts, or persistent pesticides.
- Increased risk of erosion and sedimentation from the construction of trails, stream crossings, and riparian grazing.
- Increase risk of groundwater contamination of petroleum hydrocarbons and metals from the infiltration of storm water runoff.
- The removal of surface water impoundments could result in a short-term violation of water quality standards as sediments and organic rich waters flow downstream.
- The increase in groundwater extraction could reduce surface water flows and result in increased pollutant concentration due to less dilution.
- The removal of on-stream and off-stream storage facilities, dams, and construction of minimum bypass flow and fish passage structures could result in changes to hydrology in streams as well as short-term violation of water quality standards.
- Switching from on-stream storage facilities to springs, seeps or groundwater as potential water sources could reduce the input of cold water and could results in impacts to areas of thermal refugia.

Possible Mitigation Measures
- H/WQMM-1: Storm Water Pollution Prevent Plans
- H/WQMM-2: Water Quality Monitoring
- H/WQMM-3: Develop project-specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and onsite and nearby structures into account. Ensure proper design, siting, and operational timing to reduce alterations of natural hydrology and adverse effects on stream and groundwater quality and quality from structural compliance measures.
    - Install and maintain erosion control measures (e.g. waterbars, rolling dips, mulch, rock rip-rap) to prevent discharge of excess sediment from soil disturbing activities.
    - Relocate roads away from unstable and landslide prone terrain. Drain roads away from unstable areas during construction, reconstruction of maintenance activities. Locate new roads on stable ground to the maximum extent practicable.
    - Minimize cutbank height and avoid placement of fill on steep slopes. Use off-channel water collection features for dust abatement purposes.
    - Install adequate number/type of road drainage features to prevent concentration of road runoff.
    - Seek professional (e.g. Natural Resources Conservation Service, local resource conservation district) in developing land management plans

and observational techniques to ensure optimal stocking rates for rangelands.
    - Protect drainage channels from sediment contributions with vegetated buffers, wattles or similar erosion control devices.
    - Plant a cover crop on exposed soil to reduce the length of time in which soil is exposed to wind and water. Cover exposed soil that will not receive immediate planting with straw or other suitable erosion control material.
    - Use precision (site-specific) farming techniques; monitor chemical condition of soil, water, and plant residuals carefully prior to applying fertilizers, pesticides, or water, including tailwater.
    - Leach soils within the root zone as necessary to prevent salt build up in that portion of the soil profile.
    - Avoid introduction of storm water into tailwater system to prevent impacts to storm water.
    - Maintain filter strips between fields and surface water to prevent discharge of tailwater directly into surface waters.
    - Don't concentrate drainage such that toxic levels of constituents are discharged to waters.
- H/WQMM-4: Implement flow rate modeling, monitoring, prohibitions and restrictions within specific Regional Water Board permits and orders.
- H/WQMM-5: Plant native vegetation that has evolved with the natural environment. Allow for the removal or thinning of upland vegetation that has high evapotranspiration rates and increases fire risks.

Land Use Planning

- The groundwater toxicity objective could present a conflict with groundwater management strategies such as aquifer storage and recovery.
- Installation or expansion of remediation or treatment facilities may have a potential for direct and indirect impacts to a candidate, sensitive, or special status species or their habitat and could conflict with applicable conservation plans.
- Reliance on alternative water sources, water conservation efforts, and preservation of areas of known thermal refugia could have a conflict with local plans or ordinances that call for an increase through various water supply and/or development projects.
- Municipal, domestic, agricultural and industrial water supply could be impacted by certain restrictions on the extraction of water from riparian areas or areas of known thermal refugia. Construction or expansion of off-stream water storage facilities could conflict with local plans or ordinances.

Possible Mitigation Measures

- BRMM-1: Consult the applicable state and federal resource protection

agencies
- BRMM-2: Delineate and avoid any project specific environmental sensitive areas.
- BRMM-3: Identify species-specific work windows to avoid contact or disturbances.
- BRMM-4: Compensatory mitigation to create, replace, or restore filled or modified waters of the U.S. (streams and wetlands).
- BRMM-5: Remedial action plans proposing phytoremediation would need to evaluate the potential for bioaccumulation of toxic compounds and select plants species that will not become primary producers in the food chain.
- H/WQMM-1: Develop storm water pollution prevention plans.
- H/WQMM-2 Water Quality Monitoring.
- H/WQMM-3: Develop project-specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and onsite and nearby structures into account. Ensure proper design, siting, and operational timing to reduce alterations of natural hydrology and adverse effects on stream and groundwater quality and quality from structural compliance measures.

Mineral Resources
- Preservation of riparian areas, riparian buffers, aquatic ecosystem restoration, and erosion and sediment controls could decrease access for gravel, gold or other mineral extraction activities.

Possible Mitigation Measures
- None (Less than significant)

Noise
- Temporary increase in noise from heavy equipment during remediation or treatment system installation.
- Temporary increase in noise from trucks and heavy equipment during excavations.
- Temporary increase in noise from drill rigs installing monitoring wells, injection wells, or extraction wells.
- Use of pumps, mixers, and compressors to sample, remediate and treat water.
- Use of thermal treatment units/incineration can produce noise above ambient levels.
- Switching from surface water supply to groundwater pumping could result in increases in noise.
- Construction, modification or removal of facilities for the purpose of groundwater or surface water extraction, energy supply and/or recreation could result in short-term and long-term impacts from noise.

- Aquatic ecosystem restoration, and erosion and sediment controls could increase noise from use of heavy equipment.
- Permanent increases in noise from wastewater treatment facility upgrades or from decade-long cleanup projects.

Possible Mitigation Measures

- NOMM-1: Noise Control Plans
  - Decibel monitoring
  - Peak noise working hours
  - Evening working hours
  - Equipment inspection
  - Muffler inspections
  - Nearby receptors
  - Compliant process plan
  - Operations contingency plan
- NOMM-2: Advanced notifications
- NOMM-3: Sound control structures
- NOMM-4: Equipment buffers

Population and Housing

- Water conservation and/or reliance on alternative water sources could have an impact on housing development or existing housing populations.
- Moving to reliance on larger water suppliers could increase their demand and thus lead to an increased level of water extraction in specific locations.

Possible Mitigation Measures

- None (Less than significant)

Public Services

- Retaining and preserving riparian areas can lead to increases in forest fires leading to an increased demand on fire services.
- Increased enforcement on sediment discharges from illegal cultivations could lead to an increased demand in local, state and federal law enforcement resources. Increased burden on vector control from wetland creation and sediment control basins.

Possible Mitigation Measures

- H/WQMM-5: Plant native vegetation that has evolved with the natural environment. Allow for the removal or thinning of upland vegetation that has high evapotranspiration rates and increases fire risks.

Transportation/Traffic

- Temporary increase in truck traffic from the construction or expansion of a

remediation or treatment system or restoration project.
- Temporary increase in traffic from lane closures due to subsurface investigations.
- Temporary increase in traffic from excavation activities.
- Increased tree retention and riparian restoration may conflict with transportation agencies (public roads) site distance requirements and areas designated as clear recovery zones.
- Short-term traffic increases associated with sediment reduction project, construction projects, dam removal, stream and/or riparian restoration.

Possible Mitigation Measures
- TTMM-1: Traffic Control Plans
  - Signage locations
  - Through traffic routes
  - Designated truck routes
  - Construction site access
  - Designated work and staging areas
  - Parking areas
  - Pedestrian and bicycle safety access
  - Detours and lane closures
  - Emergency access routes and detours
  - Flaggers
- TTMM-2: Night Work
- TTMM-3: Strategic planning and design to avoid and minimize the placement of facilities that have site distance conflicts. Case-by-case evaluations of site distance.
- BRMM-4: Compensatory mitigation to create, replace, or restore filled or modified waters of the U.S. (streams and wetlands).

Utilities and Service Systems
- Construction or demolition of facilities could result in short-term interruption of utilities.
- Dam removal, water conservation and/or reliance on alternative water sources could lead to short-term interruptions and could lead to a decrease in available water supply and landfill capacity.

Possible Mitigation Measure
- USSMM-1: Coordinate with the underground service alert system, and utility providers to develop project-specific plans to avoid and minimize any potential utility interruptions.
- USSMM-2: Develop waste management plans for dam removal projects. Coordinate with prospective landfills regarding the estimated amount of waste generated by a proposed project and landfill capacity.

- USSMM-2: Plan for and develop conservation and efficiency projects for water supply. Plan for and develop recycled water projects and aquifer storage and recovery (ASR) projects.

4.4.4 Discussion of Potential Environmental Impacts

Potential impacts of the reasonably foreseeable compliance measures were evaluated with respect to earth, air, water, plant life, animal life, noise, light, land use, natural resources, population, housing, transportation, public services, energy, utilities and services systems, human health, and aesthetics. Additionally, mandatory findings of significance regarding short-term, long-term, cumulative and substantial impacts were evaluated.

Thresholds of Significance

A significant effect on the environment is defined in statute as *a substantial, or potentially substantial, adverse change in the environment* where *Environment* is defined by Public Resources Code section 21060.5 as *the physical conditions which exist within the area which will be affected by a proposed project, including air, water, minerals, flora, fauna, noise, objects of historic or aesthetic significance*.[8]

Social or economic changes related to a physical change of the environment were also considered in determining whether there would be a significant effect on the environment. However, adverse social and economic impacts alone are not significant effects on the environment. A range of compliance measure costs and potential funding sources are discussed in Chapter 6 (Economic Considerations).

When assessing the significance of a potential environmental impact related to implementation of the proposed WQO Update Amendment, it is imperative to distinguish the level of mitigation possible under a proposed project versus a proposed policy. A complex policy could lead to several potential outcomes that are much more difficult to predict then would be the outcomes associated with a complicated project (e.g., a project set at one place in time that has many moving parts, but none the less has a quantifiable impact on the environment). Additionally, some potential mitigation measures proposed at the policy level may not be directly enforceable by the Regional Water Board at the project level, and therefore require re-evaluation when a specific project is under evaluation. For example, a potential mitigation measure to address air quality impacts as a result of a compliance measure designed to comply with water quality objectives is not directly enforceable by the Regional Water Board and shouldbe addressed and implemented at the project level.

Under California Code of Regulations, title 14, section 15064.7, public agencies are encouraged to develop and publish thresholds of significance for general use in the

[8] Pub. Resources Code §21068

environmental review process, via ordinance, rules or regulations. However, an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting." (Cal. Code Regs., tit. 14, §15064, subd. (b)). Thresholds are intended to be analytic tools to assist in significance determinations, not rigid standards; and they should not result in de facto policy making. Thresholds may be either qualitative or quantitative. (See "Thresholds of Significance: Criteria for Defining Environmental Significance" (Sep. 1994) OPR, available at http://ceres.ca.gov/ceqa/more/tas/Threshold.html.)

This evaluation considers whether the construction or implementation of compliance measures would cause a substantial, adverse change in any of the physical conditions within the area affected by the measure. In addition, the evaluation considers environmental effects in proportion to their severity and probability of occurrence. In this analysis, the level of significance is based on the baseline or current conditions of both the physical environment and regulatory baseline. For example, impacts associated with the construction of compliance measures are considered less than significant with mitigation because the impacts due to construction activities are temporary and similar to typical groundwater remediation, wastewater treatment projects and their associated maintenance activities currently required and performed throughout the region.

Categorical Exemptions

CEQA allows for the application of categorical exemptions for the project specific implementation of many of the compliance measures that will not have a significant effect on the environment. For example, CEQA Guidelines section 15330 (Class 30),*Minor Action to Prevent, Minimize, Stabilize, Mitigate or Eliminate the Release or Threat of Release of Hazardous Waste or Hazardous Substances* is commonly used for the assessment and remediation of groundwater cleanup sites. This exemption applies to small or medium removal actions costing $1 million or less and is commonly used throughout the state as long as the following criteria are met:

(a) No cleanup action shall be subject to this Class 30 exemption if the action requires the onsite use of a hazardous waste incinerator or thermal treatment unit or the relocation of residences or businesses, or the action involves the potential release into the air of volatile organic compounds as defined in Health and Safety Code Section 25123.6, except for small scale in situ soil vapor extraction and treatment systems which have been permitted by the local Air Pollution Control District or Air Quality Management District. All actions must be consistent with applicable state and local environmental permitting requirements including, but not limited to, offsite disposal, air quality rules such as those governing volatile organic compounds and water quality standards, and approved by the regulatory body with jurisdiction over the site.

(1) Removal of sealed, non-leaking drums or barrels of hazardous waste or substances that have been stabilized, containerized and are designated for a lawfully permitted destination;

(2) Maintenance or stabilization of berms, dikes, or surface impoundments;
(3) Construction or maintenance or interim of temporary surface caps;
(4) Onsite treatment of contaminated soils or sludges provided treatment system meets Title 22 requirements and local air district requirements;
(5) Excavation and/or offsite disposal of contaminated soils or sludges in regulated units;
(6) Application of dust suppressants or dust binders to surface soils;
(7) Controls for surface water run-on and run-off that meets seismic safety standards;
(8) Pumping of leaking ponds into an enclosed container;
(9) Construction of interim or emergency ground water treatment systems;
(10) Posting of warning signs and fencing for a hazardous waste or substance site that meets legal requirements for protection of wildlife.
Authority cited: Section 21083, Public Resources Code; Reference: Section 21084, Public Resources Code.

Additionally, CEQA Guidelines section 15333 (Class 33), *Small Habitat Restoration Projects* consists of projects not to exceed five acres in size to assure the maintenance, restoration, enhancement, or protection of habitat for fish, plants, or wildlife provided that:
(a) There would be no significant adverse impact on endangered, rare or threatened species or their habitat pursuant to section 15065,
(b) There are no hazardous materials at or around the project site that may be disturbed or removed, and
(c) The project will not result in impacts that are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.
(d) Examples of small restoration projects may include, but are not limited to:
(1) revegetation of disturbed areas with native plant species;
(2) wetland restoration, the primary purpose of which is to improve conditions for waterfowl or other species that rely on wetland habitat;
(3) stream or river bank revegetation, the primary purpose of which is to improve habitat for amphibians or native fish;
(4) projects to restore or enhance habitat that are carried out principally with hand labor and not mechanized equipment.
(5) stream or river bank stabilization with native vegetation or other bioengineering techniques, the primary purpose of which is to reduce or eliminate erosion and sedimentation; and
(6) culvert replacement conducted in accordance with published guidelines of the Department of Fish and Game or NOAA Fisheries, the primary purpose of which is to improve habitat or reduce sedimentation.
Note: Authority cited: Section 21083, Public Resources Code; Reference: Section 21084, Public Resources Code

Therefore, many of the proposed compliance measures may be considered exempt from CEQA when project-specific analysis and evaluation of implementation actions are considered.

4.5 Environmental Checklist Project-Specific Information

The following section presents the project-specific information that is required as part of the Environmental Checklist.

- Project Title:
  Proposed *Amendment to the Water Quality Control Plan for the North Coast Region to Update Water Quality Objectives* (proposed WQO Update Amendment)

- Lead Agency Name and Address:
  North Coast Regional Water Quality Control Board
  5550 Skylane Blvd, Suite A
  Santa Rosa, CA 95403

- Contact Person and Phone Number:
  Jeremiah J. Puget, (707) 576-2220

- Project Location:
  The proposed WQO Update Amendment applies to the entire North Coast Region. See Section 2.1 of this Staff Report for more information on the North Coast Region.

- Description of the Project:
  The project is the proposed *Amendment to the Water Quality Control Plan for the North Coast Region to Update Water Quality Objectives*. See Section 5.1 of this Staff Report for a full description of the project.

4.5.1 Preliminary Staff Determination

☐	The proposed project COULD NOT have a significant effect on the environment, and, therefore, no alternatives or mitigation measures are proposed.
☑	The proposed project MAY have a significant or potentially significant effect on the environment, and therefore alternatives and mitigation measures have been evaluated.

4.5.2 Discussion of Environmental Checklist Findings

I. AESTHETICS -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on			X	

a scenic vista?				
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?		X		
c) Substantially degrade the existing visual character or quality of the site and its surroundings?		X		
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		X		

Aesthetics: a) Less than Significant
Discussion: If a spill or unauthorized release occurred within a scenic vista or resources, cleanup and remediation would occur in accordance with the existing regulations. The type of equipment needed as well as the duration of operation may be increased to comply with more protective criteria; however, this difference is negligible in aesthetic impacts.

Compliance measures such as planting trees and/or retaining trees are generally regarded as positive aesthetics. Scenic vistas usually include well-vegetated areas. In some cases the planting or retention of large woody vegetation could reduce visibility to an adjacent water body; however, vegetation also provides habitat for wildlife and in known to enhance water quality which would improve the overall landscape. Compliance measures such as riparian restoration, modifications to water supply and water storage practices in agricultural lands, and erosion and sediment control measures may modify the appearance of an area; however, these measures are not likely to result in the elimination of agricultural operations and elimination of open space. Therefore, impacts to scenic vistas are considered less than significant.

Aesthetics: b), c) and d) Less than Significant with Mitigation Incorporated
Discussion: While the existing regulatory requirements already result in a baseline condition that affects the aesthetic environment (i.e., groundwater cleanup and wastewater treatment laws and regulations), more protective criteria could result in the installation of additional equipment or storage of materials that decrease views or results in an unsightly presence for a longer period of time. Additionally, more stringent requirements could result in additional wastewater ponds and/or waste management/treatment units at existing facilities. Such incremental occurrences are not likely to result in a significant environmental impact.

Compliance measures such as the preservation of large woody vegetation generally have a positive impact on aesthetics. But, retention of large woody vegetation could lead to an increase fuel load for wildfires which could then impact scenic areas. Fire impacts on riparian zones vary proportionally with the severity and extent of burning in the catchment

and are affected by stream size. Riparian zones can act as a buffer against fire and therefore as a refuge for fire-sensitive species. However, under some circumstances, such as dry pre-fire climatic conditions and the accumulation of dry fuel, riparian areas can become corridors for fire movement. Fire incursion into riparian zones creates canopy gaps and drier conditions, which allow subsequent buildup of dead wood and establishment of fire adapted species. In concert, this increases fuel loads and the probability of another fire. Secondary effects of riparian fire include altering nutrient fluxes and cycling, increasing sediment loads, and stimulating erosion. Riparian fires are potentially important in shaping ecological characteristics in many regions, but this is poorly quantified. A better understanding of riparian fire regimes is essential to assess the effects of fire in helping shape the complex ecological characteristics of riparian zones over the longer-term. (Pettit, N. E., and R. J. Naiman. 2007) Based on the evidence and nature of forest fires this appears to be a less than significant impact on the environment, if mitigated with proper fuel management. For example, the thinning of understory vegetation and select harvest prescriptions can decrease the fuel load while concurrently preserving and restoring shade along water courses. Additionally, firebreaks can be used in upland and riparian areas that do not affect water temperatures or sediment or nutrient mobility, so as to ensure strategic defense against wildfires.

A compliance measure that requires land disturbance, such as the construction of a settling basin or a riparian fence, may include minor surface soil excavation or grading during construction, which could result in increased disturbance of the soil. If, however, scenic resources were identified at the site, they would be avoided, and standard construction techniques and erosion and sediment control practices would require revegetation and would not result in permanent damage to scenic resources.

Neither the structural nor the non-structural compliance measures generally implemented as a result of this proposed policy would be expected to degrade the existing visual character or quality of a site and its surroundings, assuming application of appropriate mitigation measures. Although implementation of structural BMPs could result in some change in visual character or ground surface relief features, most of the compliance measures identified as part of the environmental analysis are of relatively small scale, such as installation of road drainage features, riparian planting, riparian fencing, small scale water diversion systems, wastewater treatment ponds, and reservoir or stream aeration structures. Likely, changes to the visual character or quality of the site and its surroundings will not be noticeable.

The larger scale projects, such as dam decommissioning, road decommissioning on USFS land, or construction of an off-stream water storage facility could potentially impact aesthetic resources. Visual impacts associated with dam decommissioning can be addressed through the decommissioning plan by including mitigation measures such as early establishment of native vegetation (grass, forbes and trees) on exposed surfaces.

The construction of an off-stream storage facility (i.e., pond) could be expected to occasionally create a new source of substantial glare which could be mitigated with proper siting and vegetated screens.

Use of the mitigation measures discussed above can reduce the level of potential adverse impact to less than significant. Additional mitigation measures are detailed in Section 4.4.3 and Table 4-1.

II. AGRICULTURE AND FOREST RESOURCES:

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Boards. Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	X			
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	X			
C) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to nonagricultural use or conversion of forest land to nonforest use?	X			

AGRICULTURE AND FOREST RESOURCES: a), b) and e) Potentially Significant and Unavoidable

Discussion: None of the potential compliance measures addressing groundwater toxicity or chemical constituents in groundwater or surface water would result in a conversion of agricultural or forested lands, conflict with existing agricultural uses, rezone forest lands, or results in the loss of forest lands. However, compliance measures to address controllable factors that affect DO may have potentially significant and unavoidable significant impacts by converting agricultural areas adjacent to waters of the state to non-agricultural uses.

Compliance measures such as riparian buffers could cause incidental loss of agricultural use in lands mapped as Prime Farmland, Unique Farmland or Farmland of Statewide Importance. These losses on a regionwide basis would only affect a very narrow band of land on either side of the watercourse, and as derived from the readily accessible information from the Farmland Mapping and Monitoring Program the U.S. Department of Agriculture National Agriculture Statistics Service, it is estimated that no more than 5% of the North Coast Region is mapped as Prime Farmland, Unique Farmland, and Farmland of Statewide Importance. Additionally, some areas that are mapped as prime, unique or important may comply already with the proposed WQO Update Amendment while others may not. Although there are many factors that affect this determination, it can be assumed that agricultural lands with a discharge of waste to waters of the state and that implement new riparian protection actions or compliance measures to address noncompliance with the DO objectives could be taking land out of production.

While avoidance and minimization measures can be used to lessen impacts, and experience suggests that some modified management of riparian zones is often appropriate, there is no mitigation for loss of land where that occurs. Therefore, this is a potentially significant and unavoidable impact. In some instances, the following mitigation measure may reduce the level of significance.

AGRMM-1: Coordination between project proponents, Regional Water Board staff and other local, state and federal agencies to achieve project-specific potential shade protections, nutrient load reductions, protection of areas of thermal refugia, and the preservation of agricultural lands.

AGRICULTURE AND FOREST RESOURCES: c) and d) No Impact

Discussion: No element of the proposed WQO Update Amendment will rezone or force the rezoning of Timberlands Production or result in the conversion of forested land to non-forested land. In short, the predominant, anticipated compliance measure for timberlands requires the retention of more forested area along streams and is consistent with the requirements of the recently adopted Temperature Implementation Policy. Therefore, this proposed policy has no impact on the classification of conversion of timberlands.

III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?				X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?		X		
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		X		
d) Expose sensitive receptors to substantial pollutant concentrations?		X		
e) Create objectionable odors affecting a substantial number of people?			X	

Air Quality: a) No Impact
Discussion: The proposed WQO Update Amendment does not violate any clean air plans. Compliance measures intended to meet water quality objectives would not be permitted or forced to be implemented in a way that would conflict with an air quality management plan.

Air Quality: b), c), d) Less than Significant with Mitigation Incorporated
Discussion: Emissions from equipment used for construction, installation of facilities or treatment measures have the potential for temporary adverse effects to air quality. The primary pollutants of concern in these emissions are NOx or nitrogen oxides. Other emissions of concern could be carbon monoxide and PM_{10} (particulate matter < 10 microns). In order to evaluate the air quality impact of emissions due to compliance measures and associated equipment, the project proponent must identify the specific type of equipment that will be used in the remediation action. Next, emissions from the equipment must be quantified and evaluated in the context of air quality standards for the area in which the remediation is occurring, climate and meteorology, and time of year remediation will occur. A project scheduled in the winter may be less likely to cause exceedances of ozone standards than an action taken in the summer when ambient ozone

levels are higher. This must be balanced with erosion-control measures which may preclude wet weather activity.

When evaluating the potential adverse effects to air quality, the project proponent must contact the appropriate regional air district for assistance in determining whether the amount of emissions generated at the remediation site will cause a violation of air standards. Project proponents will be responsible for meeting the requirements of the local air quality district for their specific project. If there is potential for an air quality violation, the project proponent must attempt to prevent or control emissions. This can be done by operating equipment under permit, purchase of air credits or offsets, use of electric equipment, planning the project for the time of year or day when emissions would be least likely to cause an exceedance of air quality standards, optimizing the mode of transportation, favoring disposal sites closer to the project sites, and minimizing the number of trips necessary to transport material to the disposal site or re-handling facility.

Compliance measures used to remediate soil and/or groundwater and to treat wastewater could result in the temporary generation of hydrogen sulfide, vinyl chloride, methane, ethane and ethene gases. The Bay Area Air Quality Management District (BAAQMD), which includes Sonoma County, has an air quality standard for hydrogen sulfide gas of 0.03 parts per million (ppm) or 42 $\mu g/m^3$ (1 hour average). The BAAQMD has an air quality standard of 0.010 ppm or 26 $\mu g/m^3$ (24-hour average), for vinyl chloride gas. Although select compliance measures may result in the generation of gases, it is unlikely. Other past projects using similar technologies within the jurisdiction of the Regional Water Board did not generate hydrogen sulfide or vinyl chloride gases.

The North Coast Unified Air Quality Management District (NCUAQMD), which includes Del Norte, Humboldt and Trinity Counties, is listed as "attainment" or “unclassified" for all the federal and state ambient air quality standards, except for the state 24-hour particulate (PM_{10}) standard. The District has not exceeded the federal annual standard for particulate matter during the last five year period. Primary sources of particulate matter in the Eureka area are on-road and off-road vehicles (engine exhaust and dust from paved and unpaved roads), open burning of vegetation (both residential and commercial), residential wood stoves, and stationary industrial sources (factories).

The entire North Coast Air Basin is currently designated as nonattainment for the State 24-hour PM_{10} standard. The attainment plans, rules and regulations, and criteria pollutant attainment status are different for each of the three air districts in the North Coast Air Basin.

Compliance measures that are intended to breakdown pollutants could result in the generation and emission of gases, but is unlikely. Several past projects using similar technologies within the jurisdiction of the Regional Water Board did not detect gases in ambient air. Additionally, thermal destruction incinerators or phytoremediation actions

could produce off-gas, which themselves require treatment by an air pollution-control system to remove particulates and neutralize and remove acid gases (HCl, NO_x, and SO_x). If mitigation measures such as air quality monitoring plans and gas/particulate matter capture systems are added to the necessary compliance measures selected for use, these potential impacts to air quality will be less than significant. Additional mitigation measures are detailed in Section 4.4.3 and Table 4-1.

The compliance measures to address DO are anticipated to have a beneficial effect on the environment, greenhouse gas (GHG) emissions and climate change. Further, actions such as riparian preservation and restoration will sequester carbon from the atmosphere through plant photosynthesis. In addition, trapping soils through erosion and sediment control will reduce GHGs when carbon is locked up in trapped sediments, as well as living vegetation. Therefore, it is staff's judgment that the overall long-term benefits of the proposed WQO Update Amendment will aid in the reduction of GHGs and help provide resilience in the condition of North Coast watersheds and water resources as we face the uncertainty of climate change.

Compliance measures could result in the generation of fugitive dust and particulate matter during construction or maintenance activities, which could temporarily impact ambient air quality. Any such impacts would be temporary, and would be controlled with standard construction operations, such as the use of moisture to reduce the transfer of particulates and dust to air and conducting operations when the air quality in the basin is good (i.e. no catastrophic wildfires). The emissions of air pollutants during the construction of facilities for compliance are unlikely to have an effect on ambient air quality.

Implementation of compliance measures that require the use of heavy equipment (e.g., such as dam decommissioning, construction of settling basins, road drainage installation or re-contouring of existing road prisms), could result in vehicle emissions during construction. However, these impacts would be short-term, and would not result in conflicts with, or obstruction of the implementation of the applicable air quality plan. Air quality impacts associated with heavy equipment used to modify or remove on-stream or off-stream storage facilities or implement other structural compliance measures such as those could be potentially significant; but, they would be limited to those resulting from short-term construction activities. Compliance measures such as erosion control, reservoir reseeding and riparian planting are not likely to result in a violation of air quality standards.

Air Quality: e) Less than Significant Impact

Discussion: Subaqueous materials and sludge have the potential to create objectionable odors (e.g., hydrogen sulfide), and this is a potential adverse impact to air quality at the site where materials are removed, transported and disposed or reused. Whether the odor is considered to be significant is a function of the location of the site and whether a substantial number of people are affected. Reuse and disposal facilities must be located

and designed to avoid generating nuisance odors that will adversely affect surrounding neighborhoods. It is unlikely that the proposed WQO Update Amendment will require new facilities. Considering the existing baseline and the short duration and locations of these activities, the impacts are expected to be less than significant.

IV. BIOLOGICAL RESOURCES -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?		X		
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		X		
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		X		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		X		
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?		X		

BIOLOGICAL RESOURCES: a), b), c), d), e) and f) Less than Significant with Mitigation Incorporated

Discussion: There are numerous Federal and State listed endangered and threatened animals which are known to be present, or have habitat they depend on in the North Coast Region. Such species could potentially be adversely impacted by measures implemented to

comply with the proposed policy, if only temporarily. The location of sensitive species and habitat must be assessed on a project by project basis. Compliance measures to treat soil and/or groundwater and treat wastewater all have the potential to cause adverse effects to biological resources in several ways: short-term habitat destruction and displacement of sensitive species, possibly during critical periods such as nesting; disturbance of sensitive spawning or migrating fish species due to turbidity; and, "take" of endangered species.

With respect to site remediation, alternatives could occur in various types of habitats. Provisions of any cleanup plan are expected to result in the removal of pollutants that have adverse effects on plants and animals. This will improve habitat, and encourage development of and protect rare and endangered species, as well as fish and wildlife generally. There is a possibility that the quality of the environment could be temporarily degraded with potential effects on endangered species, if cleanup and mitigation projects are not carefully planned and executed. Potential adverse effects of identified remediation alternatives vary with different habitats, species, and time of year, as well as methods for remediating the site. Any potential adverse effects must be mitigated through consultation with the California Department of Fish and Wildlife (CDFW) and the U.S. Fish and Wildlife Service (USFWS). When installing structural compliance measures that involve substantial earth moving or riparian restoration activities that have the potential to affect candidate, sensitive, or special status species, project proponents are required to consult with federal, state and local agencies, including but not limited to the county, CDFW and the USFWS Project proponents must ensure project actions avoid, minimize and/or mitigate for impacts to rare, threatened or endangered species.

Riparian and wetland communities have been greatly reduced in size within California with wetland losses of up to 91 percent by estimation of the USFWS. Thus, such habitats within the region are very important to the many species they support. Special-status species are vulnerable to any habitat loss or degradation. The ability to move to other habitat through wildlife corridors is vital to many terrestrial species. Modification of existing terrestrial habitat in the project area, especially limited riparian and wetland habitat, would have the potential to cause adverse effects.

The expansion of remediation or treatment facilities may have a potential impact upon species identified as a candidate, sensitive, or special status species if they occur in an area where such species are located. While most facilities will not be sited in such locations spills and unauthorized releases along roads or highways that are adjacent to wetlands, rivers, and riparian areas give the potential. Additionally, many of the wastewater treatment plant facilities, reservoirs and areas of agriculture in the region are located near waterbodies with several sensitive and special status species. Expansion or installation of compliance measures in these areas could result in incremental adverse impacts to sensitive species habitats. The use of phytoremediation could result in bioaccumulation of toxic compounds if primary producing organisms became prey for threatened or endangered species. Reservoir or stream aeration structures have the potential to cause

adverse effect on biological resources while being constructed, and could be improperly managed resulting in the supersaturation of the water column with oxygen which can stress or increase aquatic organism mortality. Additionally, a loss of wetland habitat from repair of leaky conveyance systems or alteration of irrigation practices has the potential to occur.

Stream restoration actions to reduce erosion, remove sediment, and improve habitat, or riparian restoration actions to increase shade, may conflict with the habitat requirements of certain flora or fauna. Specific examples include low lying flora that could be out competed in the riparian zone by taller, shade producing trees. In most cases, impacts could be avoided by adjusting the timing and/or location of the actions to take into account candidate, sensitive, or special status species or their habitats. Additionally, project-specific potential shade conditions are assessed and addressed on a case-by-case basis. Therefore, conflicts between the proposed compliance measures to address DO and particular species would be resolved at the project level. The process for designing, permitting, and implementing mitigation measures includes collaboration between water board staff and CDFW and USFWS staff to reach agreement on the most appropriate approach to protecting sensitive beneficial uses.

During project level construction activities to implement compliance measures, both structural and non-structural mitigation measures can be implemented to avoid, minimize or mitigate potentially significant impacts to sensitive species. Once a project plan is prepared and construction areas are delineated, measures must be implemented prior to and during construction to avoid and mitigate impacts to sensitive vegetation communities such as wetlands. For example, wetlands within 100 feet of any ground disturbance and construction-related activities (including staging and access roads) would be clearly marked and/or fenced to avoid impacts from construction equipment and vehicles. If new, temporary access roads are required, grading would be conducted such that existing hydrology would be maintained. In addition, water pollution control measures such as erosion control, sediment control, and waste management would be implemented to avoid and minimize potential water quality impacts from polluted storm water runoff to streams, wetlands and riparian areas.

Compliance measures to reduce erosion and sedimentation include rangeland planting and riparian restoration which has the potential to disturb soil and introduce non-native or invasive species. Mitigation measures to reduce these potential impacts include use of certified weed-free grass and project specific seed mixes to prevent the introduction or non-native on invasive species. Another example of avoidance or minimization includes work window restriction on stream restoration activities for the protection of several aquatic species. Additionally, aquatic ecosystem creation, restoration or enhancement projects are often designed to provide compensatory mitigation for impacts that cannot be avoided or minimized. Remedial action plans proposing phytoremediation would need to evaluate the potential for bioaccumulation of toxic compounds and select plants species

that will not become primary producers in the food chain. Additionally, water quality monitoring may be a necessary to verify treatment and ensure no cross-media migration of pollutants.

While these impacts have the potential to occur, the likelihood of a significant adverse impact as a result of the proposed WQO Update Amendment it is unlikely. Nevertheless, measures to avoid impacts to biological resources (e.g., environmentally-sensitive area fencing and minimization measures like species-specific work windows) should be used to reduce potential impacts. All activities in federally-protected wetlands, except those statutorily exempt (e.g., agriculture), require the responsible party to obtain a Clean Water Act (CWA) Section 404 permit from the Army Corps of Engineers and a CWA Section 401 Water Quality Certification. These permits must include conditions that ensure that all water quality objectives for the wetland are protected. If a direct fill of a stream or wetland is absolutely necessary, then adequate compensatory mitigation in accordance with federal and state regulatory programs will be required to replace the loss of functions and values in compliance with the State's No Net Loss Policy[9].

Under CWA Section 404, the Corps issues permits to regulate discharges of dredged or fill material to waters of the United States. The CWA Section 404(b)(1) Guidelines are the environmental criteria used in evaluating discharges of dredged or fill material under CWA Section 404. Under the guidelines, the analysis of practicable alternatives is the primary screening mechanism to determine the necessity of permitting a discharge of dredged or fill material into regulated waters. The guidelines prohibit all discharges of dredged or fill material into regulated waters unless the discharge constitutes the least environmentally damaging practicable alternative that will achieve the basic project purpose.

The Corps must conduct a public interest review that weighs benefits versus detriments of the project and considers all relevant factors including: conservation, aesthetics, wetlands, flood hazards, flood plain values, navigation, recreation, water quality, safety, mineral needs, economics, general environmental concerns, cultural values, fish and wildlife values, land use, shoreline erosion and accretion, water supply and conservation, energy needs, food and fiber production, property ownership, and the needs and welfare of the public. The permit process must comply with National Environmental Policy Act (NEPA).

The Corps may also issue General Permits for discharges of dredged materials that have minimum adverse environmental effects (including cumulative effects). General Permits usually contain project-specific mitigation requirements. Nationwide Permits are issued by the Corps for specified types of projects that are limited in size and impacts. Section 404(b)(1) directs the U.S. EPA to develop guidelines for issuance of fill permits. The stated policy in these guidelines is that discharges of dredged or fill material into waters of the

[9] Executive Order W-59-93

United States should not be conducted unless it can be proven that it will not have an unacceptable adverse direct or cumulative impact. U.S. EPA may prohibit placement of fill if there will be an unacceptable adverse effect on: municipal water supplies, shellfish beds, fisheries, wildlife, or recreation areas. The guidelines provide that dredged or fill material shall not be permitted in a water of the United States if there is a practicable alternative that would have less impacts. For "Special Aquatic Sites" (wetlands, wildlife sanctuaries, mudflats, vegetated shallows, and riffle and pool complexes in streams), the guidelines presume that practicable alternatives are available and the permit applicant must provide otherwise.

CWA Section 401 allows states (Regional Water Boards and State Water Board) to deny or grant water quality certification for any activity which may result in a discharge to waters of the United States and which requires a Federal permit or license. Certification requires a finding by the State that the activities permitted will comply with all water quality standards individually or cumulatively over the term of the permit. Under Federal regulations (40 Code of Federal Regulations Section 131), water quality standards include the designated beneficial uses of the receiving water, the water quality criteria for those waters, and an antidegradation policy. Certification must be consistent with the requirements of the Federal CWA, the CEQA, the California Endangered Species Act (CESA), and the State Water Board mandate to protect beneficial uses of waters of the State. In order to certify a project, the state must certify that the proposed discharge will comply with all of the applicable requirements of CWA Sections 301, 302, 303, 306, and 307 (42 U.S.C. Sections 1311, 1312, 1313, 1316, and 1317).

Essentially, the Regional Water Board or State Water Board must find that there is reasonable assurance that the certified activity will not violate water quality standards. Water quality standards include water quality objectives and the beneficial uses of the receiving water, including all existing beneficial uses whether designated or not. CWA Section 401 requires the water quality certification process to comply with CWA Section 404(b)(1) Guidelines. CWA Section 401 allows the state to grant or deny water quality certification for any activity which may result in a discharge to navigable waters and which requires a federal permit. The Corps Section 404 permit is not valid if the State denies water quality certification.

California Fish and Game Code Section 1600 et seq. establishes a process to ensure that projects conducted in and around lakes, rivers or streams do not adversely impact fish and wildlife resources, or when adverse impacts cannot be avoided, ensures that adequate mitigation and or compensation is provided. Sections 1601 and 1603 of the Fish and Game Code are the primary sections with regard to developing Stream Bed Alteration Agreements. Projects that divert, obstruct or change the natural flow or bed, channel or bank of any river, stream, or lake where there is an existing fish or wildlife resource are subject to Section 1600. Fish and Game Code 1601 regulates the agreement process for projects proposed by state or local government agencies or public utilities while section

1603 regulates the process for projects proposed by all private project sponsors and federal projects without a state agency sponsor.

Any displaced habitats should be replaced nearby with equal or greater area and density, and restoration of the site or restoration of an offshore location should be required to mitigate for loss of any intertidal habitat.

Under the CESA, no person can "take" endangered or threatened species, except in cases where the CDFW issues an "incidental take" permit. Such a permit can only be issued if all of the following conditions are met:

- The take is incidental to an otherwise lawful activity.
- The impacts of the take are minimized and fully mitigated.
- The permit is consistent with any applicable Department regulations.
- The applicant ensures adequate funding to implement the mitigation measures and for monitoring compliance with, and effectiveness of, those measures.
- Permit issuance would not jeopardize the continued existence of the species.

Mitigation actions CDFW has typically required in association with incidental take authorizations and consultations have included:

- Protection of habitat of the affected species
- Establishment of an endowment to manage the protected habitat
- Provision of funds for enhancement of the protected land by fencing, initial trash cleanup, and related measures
- Implementation of various standardized construction avoidance measures
- Implementation of various standardized construction monitoring and reporting actions
- Implementation of other miscellaneous actions to reduce potential impacts; e.g., requiring that construction or operations employees be given orientation and training regarding the sensitive species, their habitats, and actions to be taken to minimize or avoid impact.

Based on the regulatory programs in place and variety of avoidance, minimization and mitigation measures available, the impacts to species, habitat, and federally protected waters from compliance measures to address chemical constituents and groundwater toxicity are less than significant with mitigation incorporated.

The majority of the North Coast Rivers and their tributaries provide habitat, including migration corridors, for both native resident and migratory fish. A migratory corridor is generally described as a landscape feature (such as a ridgeline, canyon, stream or riparian strip) within a larger natural habitat area that is used frequently by animals to facilitate movement and provide access to necessary resources such as water, food, or den, nesting or spawning sites. Wildlife corridors are generally an area of habitat, usually linear in

nature, which connect two or more habitat patches that would otherwise be fragmented or isolated from one another. Most of the compliance measures will likely not interfere with the movement of these species. Although an activity such as dam removal would ultimately increase migration potential for aquatic organisms, significant adverse effects on aquatic species movement could occur at least temporarily, unless appropriate mitigation is implemented to limit the duration of impacts (e.g., temporary increases in turbidity). Any such activity should be timed to protect or reduce impact on the most sensitive species/life stages.

Compliance measures and BMPs such as riparian fencing (for cattle exclusion) and silt fence and straw wattles (for sediment control) have been known to entrap or entangle terrestrial wildlife (such as elk and deer), as well as some aquatic species (salamanders) and reptiles (snakes). Some specific areas are more prone to creating barriers to wildlife and can best be dealt with on a case-by-case basis. If there is a potential for an adverse impact to wildlife migration and/or use of a native wildlife nursery, the timing of the discharge and the location or the type of the compliance measure can be changed to avoid or minimize the impact to less than significant levels. For example, rotational grazing practices and hot wire fences are alternatives to exclusionary fencing, where exclusionary fencing has the potential to impede wildlife migration. Another option is to concentrate efforts on erosion control methods so as to avoid using silt fences in sensitive areas. Additionally, natural fiber straw waddles without plastic netting are available to use as alternatives to sediment control technologies that may be a migration barrier. Based on the project-specific situation, avoidance, minimization, and mitigation measures associated with a particular project, the potential impacts are less than significant with mitigation incorporated.

There is a potential for curtailments in surface water rights to meeting TMDL or other regulatory requirements in order to meet the objective for DO. Reductions in available water rights could results in the increased use of riparian water rights and groundwater. Therefore, as a result of the proposed Basin Plan Amendment, there could be an increase in riparian diversion of surface water and groundwater if water users choose to utilize riparian basis of right in addition to or in lieu of utilizing an appropriative water right. Increased riparian diversion could reduce surface water flows in the spring and summer, which are critical periods for fish habitat.

Although riparian water rights do not require the State Water Board's approval, the State Water Board has the authority to regulate riparian rights under the reasonable use doctrine. A particular water use or method of diversion may be determined to be unreasonable based on its impact on fish, wildlife, or other instream beneficial uses. (*Environmental Defense Fund, Inc. v. East Bay Municipal Utility District* (1980) 26 Cal.3d 183.)

The State Water Board also has an affirmative duty to take the public trust into account in the planning and allocation of water resources. The purpose of the public trust doctrine is to protect navigation, fishing, recreation, environmental values, and fish and wildlife habitat. (*National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419, 434-435.) Under the public trust doctrine, the State retains supervisory control over the navigable waters of the state and the lands underlying those waters. (*Id*. at p. 445.) In applying the public trust doctrine, the State Water Board has the power to reconsider past water allocations even if the State Water Board considered public trust impacts in its original water allocation decision. Thus, the State Water Board may exercise its authority under the doctrines of reasonable use and the public trust to address reduced instream flows in the policy area and adverse effects to fish, wildlife, or other instream beneficial uses due to riparian diversions. Based on the range of possible mitigation measures, these potential impacts are considered less than significant with mitigation incorporated.

Compliance measures do have the potential to conflict with ordinances protecting biological resources, such as a local tree preservation policy, or an endangered species near a wastewater treatment plant outfall. It is unlikely that the implementation of compliance measures would conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP) or other approved local, regional, or state habitat conservation plan. However, it is possible that a wastewater facility expansions or unauthorized discharges or spills could result in a remedial action. Compliance measures that encourage riparian protection, treat wastewater and remediate contaminated soil and groundwater are not expected to conflict with ordinances protecting biological resources, but do have the potential to impact threatened or endangered species in the region.

It could be possible that a low lying special status species with an associated conservation plan could be present in the riparian zone that could accommodate larger trees to produce shade. However, the larger shade producing vegetation may out compete or adversely affect that special status species. These instances are likely sparse and since compliance measures are to be implemented case-by-case these types of discrepancies can be handled at the project or permit level through agency collaboration and so as to prevent significant impact on the environment. Additionally, compliance measures leading to an expansion of soil and groundwater remedial or wastewater treatment facilities could occur within areas with existing HCPs or NCCPs; however, these measures are focused on improving habitat and reducing toxicity that may adversely affect biological resources. While the likelihood of such impacts remains low the presence of threatened and endangered species does create a potential for impact. Therefore, less than significant with mitigation is the appropriate finding. A summary of potential impacts to biological resources and mitigation measures are presented in Section 4.4.3 and Table 4-1.

V. CULTURAL RESOURCES -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?		X		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?		X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			X	
d) Disturb any human remains, including those interred outside of formal cemeteries?		X		

CULTURAL RESOURCES: a), b) and d) Less than Significant with Mitigation Incorporated

Discussion: It is unlikely that the majority of compliance measures would cause a substantial adverse change in the significance of a historical or archaeological resource pursuant to section 15064.5. The implementation of compliance measures as recommended under the proposed WQO Update Amendment would not result in the alteration of a significant historical or archaeological resource. However, in cases where the installation or expansion of compliance measures may involve large scale excavations or earth disturbing activities, a cultural resources investigation should be conducted before any substantial disturbance. The cultural resources investigation will include, at a minimum, a records search for previously identified cultural resources and previously conducted cultural resources investigations of the project parcel and vicinity. All future actions must comply with the CEQA process and requirements for tribal consultation provided by Senate Bill 18 (SB 18) (State 2004, Ch 905) and Government Code section 65252.

In the event that avoidance is infeasible, the future projects will be required to follow Native American Heritage Commission's mandate for Native American Human Burials and Skeletal Remains, in partnership with affected tribe(s), in order to adequately provide for recovering scientifically consequential information for the site. In the event that the ground disturbances uncover previously undiscovered or documented resources, California law protects Native American burials, skeletal remains, and associated grave goods regardless of the antiquity and provides for the sensitive treatment and disposition of those remains. (Health & Safety Code, Section 7050.5; Public Resource Code, Section 5097.9 et seq) This record search should also include, at a minimum, contacting the appropriate information center of the California Historical Resources Information System,

operated under the auspices of the California Office of Historic Preservation. In coordination with the information center or a qualified archaeologist, a determination regarding whether previously identified cultural resources will be affected by the proposed project must be made and if previously conducted investigations were performed to satisfy the requirements of CEQA. If not, a cultural resources survey would need to be conducted. The purpose of this investigation would be to identify resources before they are affected by a proposed project and avoid the impact. If resources are identified, project-specific implementation will minimize impacts. Additional mitigation measures are detailed in Section 4.4.3 and Table 4-1.

CULTURAL RESOURCES: c) Less than Significant

Discussion: The implementation of compliance measures is not likely to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Similarly, it is unlikely that implementation of any compliance measure would result in the destruction of a unique paleontological resource or site or unique geologic feature. However, in cases that involve excavation activities, an investigation of paleontological resources would need to be conducted by a trained professional before any substantial disturbance of land that has not been disturbed previously.

VI. GEOLOGY AND SOILS -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?		X		
b) Result in substantial soil erosion or the loss of topsoil?		X		
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?		X		

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?		X		

GEOLOGY AND SOILS: a) (i, ii, and iii), and d) No Impact
Discussion: None of the compliance measures would result in any adverse impact related to fault zones, liquefaction or other seismic related activity. Nor would it result in any lateral spreading, subsidence, liquefaction, or collapse. Even if structural BMPs that were recommended were located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), they would not create substantial risks to life or property. The structural BMPs that have been identified as the foreseeable means of compliance do not involve moving permanent structures or people into a new area, and so there would be no risk to life or property created.

GEOLOGY AND SOILS: a) (iv), b), c) and e) Less than Significant Impact with Mitigation Incorporated
Discussion: Compliance measures do not change the exposure of people or structures to potential substantial adverse effects involving landslides over current conditions. The geographic scope of the activities covered under the proposed WQO Update Amendment will include areas that are highly susceptible to soil erosion and shallow landslides due to the presence of steep slopes, high rainfall rates, and/or underlying geology. A major focus of the sediment control actions discussed here and in existing regulation are designed to ensure proper road drainage, surface soil stability, avoidance of unstable areas, and full vegetation potential which reduces soil erosion, and can reduce or prevent large-scale slope and fill failures.

Implementation of compliance measures such as wells, ponds, trenches, aquatic ecosystems restoration, erosion and sediment controls and other facility expansions that involve construction may result in temporary ground disturbances. Soil excavations, compost operations or land farming could result in erosion and sedimentation. However, construction related erosion impacts should cease with the cessation of construction activities. Standard best management practices (BMPs) to address erosion, sediment, and pollution prevention should be used on cleanup or waste treatment sites.

Facility pollution prevention plans should be developed to ensure that the correct BMPs are selected during installation of remedial actions and for the operation of such facilities or treatment measures. For example excavated material if stockpiled should be covered prior to precipitation to avoid contaminating storm water runoff. Additionally, if a large facility expansion is necessary, the development of a storm water pollution prevention plan

(SWPPP) may be required. For construction activities that are greater than one acre, the development enrollment under the NPDES construction storm water permit will be required. Based on the existing regulatory conditions and existing BMPs available, this proposed Basin Plan amendment is not likely to have an adverse effect on soil erosion or loss of topsoil. Therefore, the impact is less than significant with mitigation incorporated.

Compliance measures like excavation and trenching create the potential to encounter expansive soils, soil collapse, and structures. However, compliance measures implemented at a project site requires site a specific work plan and health and safety plan to be developed by a licensed geologist or engineer prior to implementation. Such plans ensure conditions are assessed and impacts appropriately avoided prior to initiation of the project. Onsite staff will be made aware of potential risks and management measures associated with any structures, soil instability, expansive soils, or other features associated with the unique nature of the project setting, with specific attention to potential risks to life or property and appropriate protections.

Compliance measure to address nutrients, chemical constituents and groundwater toxicity may result in addressing septic tanks or alternative wastewater treatment systems. However, the development of project-specific remedial action plans or wastewater treatment system design must take site-specific characteristics into account and ensure regulatory approval. The mitigation measures discussed above, in Section 4.4.3 and Table 4-1, are existing regulatory requirements and can be applied in many different settings to mitigate potential adverse impacts to soils and geology.

VII. GREENHOUSE GAS EMISSIONS – Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate Greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

GREENHOUSE GAS EMISSIONS: a) and b) Less than Significant

Discussion: Adoption of the policy itself will not cause a direct impact to greenhouse gases (GHGs). Implementation of the compliance measures at the project level could result in an increase risk or contribution to greenhouse gases related to exhaust from equipment and vehicles used during construction activities, such as restoration and alternate water supply

construction. In most cases, the potential adverse impacts stem from minor facility alterations and improvements or extended operation and maintenance of wastewater treatment or groundwater remediation facilities, as compared to the current baseline. This incremental increase in emissions is not likely to cause an adverse effect.

Furthermore, any remediation or treatment projects must be consistent with the State Water Board Resolution No. 2008-0030 which directs Water Board staffs to "require…climate change considerations, in all future policies, guidelines, and regulatory actions." Also, the proposed WQO Update Amendment is intended to be implemented in a manner which conforms with the goals of Assembly Bill (AB) 32 (States, 2005, ch 488). AB 32 requires that GHG emissions be reduced to 1990 levels by 2020. This requirement relates to anthropogenic sources of GHGs. Impacts associated with individual projects implemented under this policy, will be analyzed for their potential to increase GHGs, and appropriate mitigation implemented to reduce that potential. Finally, implementation of compliance measures which serve to sequester nutrients, retain soils on the landscape, and increase biomass, also generally serve to sequester GHGs thus having a net positive impact.

Climate change is likely to create increased groundwater pumping due to reduced surface water flows during summer months. As extraction pressures on groundwater basins increase, there may be increased attempts to remediate contaminated aquifers. Developing additional groundwater supplies through remediation will increase California's ability to provide water supplies during drought periods. Making more groundwater basins available for water storage also allows for augmentation of groundwater supplies with recycled or desalinated water. Some of the treatment technologies used for groundwater remediation are energy intensive and may result in increased GHG emissions above the existing baseline. However, the restoration and protection of groundwater basins promote local sustainability and reliable yield; which may facilitate less energy intensive water imports and complicated infrastructure, ultimately leading to reduced GHG emissions. Therefore, the potential for an increase in GHG emissions is less than significant.

VIII. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		X		
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the		X		

environment?				
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?		X		
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?		X		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?		X		
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?		X		
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?		X		

HAZARDS AND HAZARDOUS MATERIALS: a), b), c) d), e), f), and h) Less than Significant with Mitigation Incorporated

Discussion: The existing regulatory baseline includes numerous federal, state and local laws regarding the designation, handling, transportation and disposal of hazardous substance. Nothing in the proposed WQO Update Amendment alters this existing regulatory baseline. However, the manner in which hazardous materials are handled and controlled, can have environmental impacts appropriate highlighted here.

Specifically, in any action involving chemicals or toxic pollutants, there is a potential for release of pollutants due to an accident or upset condition. The potential for such releases can be greatly reduced by proper planning. Measures to prevent releases of toxic pollutants include such things as pollution prevention technology (e.g., automatic sensors and shut-off valves, pressure and vacuum relief valves, secondary containment, air

pollution control devices, double walled tanks and piping), access restrictions, fire controls, emergency power supplies, contingency planning for potential spills and releases, pollution prevention training and other types of mitigation appropriate to the cleanup plan. Remedial action plans should and do consider site geology, hydrology, surrounding land uses and potential receptors, costs, and air quality control plans (including monitoring and contingency plans) if necessary.

Fuels, lubricating oils, and other petroleum products will be used during cleanup activity. Well established techniques for controlling spills, leaks, and drips should be incorporated in work plans, remedial action plans, treatment plans and site health and safety plans to assure the control of petroleum products and any other chemicals used during the cleanup activity. In order to mitigate the potential adverse effects, pollution prevention plans and waste management BMPs should be used in conjunction with the implementation of compliance measures.

Existing regulations require the proper storage, handling and use of these types of materials. In the event of an accident, responsible parties must comply with the requirements of the California Emergency Management Agency Hazardous Materials Spill reporting process. Any significant release or threatened release of a hazardous material requires immediate reporting by the responsible person to the Cal EMA State Warning Center (800) 852-7550 and the Certified Unified Program Agency (CUPA) or 911. The CUPA may designate a call to 911 as meeting the requirement to call them. Contact information for a jurisdiction's CUPA can be found at http://cersapps.calepa.ca.gov/Public/Directory/ or http://cersapps.calepa.ca.gov/Public/UPAListing. Notifying the State Warning Center (800) 852-7550 and the CUPA or 911 constitutes compliance with the requirements of section 11004 of title 42 of the United States Code regarding verbal notification of the SERC and LEPC (California Code of Regulations, Title 19 Section 2703 (e)). Additional information regarding spill reporting may be found at http://www.calema.ca.gov/HazardousMaterials/Pages/Spill-Release-Reporting.aspx

Road repair and maintenance can involve the transport and use of materials that would qualify as hazardous pursuant to the California Health and Safety Code section 25501(o). There is the possibility that hazardous materials may be transported to a site and be present during compliance measure construction, installation and maintenance activities. These materials include gasoline and diesel to fuel equipment, hydraulic fluid associated with equipment operations and machinery, asphalt and oils for road surfacing, and surface stabilizers (e.g. lignin) for running surfaces on unimproved roads. Maintenance yards house fuel, oil (machine, hydraulic, crankcase), chemicals (acids, solvents & degreasers, corrosives, antifreeze), hazardous waste, heavy metals, nutrients, fertilizer, pesticides, herbicides, paint products, and sediments. Maintenance yard activities have the potential to discharge these materials to storm water drain systems or watercourses. Some BMPs specifically target proper storage of these types of materials. Dust palliatives and de-icing

agents may be used in some instances; but, these materials properly applied according to BMPs are not considered hazardous materials. Compliance measures would have the potential for a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials.

In order to mitigate the potential adverse effects, pollution prevention and waste management BMPs should be used in the implementation of compliance measures. Existing regulations require the proper storage, handling and use of these types of materials. The U.S. Forest Service, California Department of Transportation, Five Counties Salmonid Conservation Program in the Counties of Del Norte, Humboldt, Mendocino, Siskiyou, and Trinity in the North Coast Region, California Association of Storm Water Quality, are just a few of the examples of exiting manuals that provide numerous pollution prevention and waste management BMPs. Many of these manuals include measures to be taken in the event of a spill.

Retention of large woody vegetation could lead to an increase fuel load for wildfires which could then impact scenic areas. Fire impacts on riparian zones vary proportionally with the severity and extent of burning in the catchment and are affected by stream size. Riparian zones can act as a buffer against fire and therefore as a refuge for fire-sensitive species. However, under some circumstances, such as dry pre-fire climatic conditions and the accumulation of dry fuel, riparian areas can become corridors for fire movement. Based on the evidence and nature of forest fires this appears to be a less than significant impact on the environment, if mitigated with proper fuel management. For example, the thinning of understory vegetation and select harvest prescriptions can decrease the fuel load while concurrently preserving and restoring shade along water courses. Additionally, firebreaks can be used in upland and riparian areas that do not affect water temperatures or sediment or nutrient mobility, so as to ensure strategic defense against wildfires.

The mitigation measures discussed above and identified in Section 4.4.3 and Table 4-1 will likely reduce the level of impacts to less than significant.

HAZARDS AND HAZARDOUS MATERIALS: g) No Impact
Discussion: The proposed WQO Update Amendment will not result in compliance measures that will impair or hinder any emergency response plans.

IX. HYDROLOGY AND WATER QUALITY -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	X			
b) Substantially deplete groundwater supplies				

or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	X			
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite?		X		
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?		X		
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?		X		
f) Otherwise substantially degrade water quality?		X		
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?		X		
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?		X		
j) Inundation by seiche, tsunami, or mudflow?				X

HYDROLOGY AND WATER QUALITY: a) Potentially Significant and Unavoidable
Discussion: Water quality standards consist of the water quality objectives, the beneficial uses of water and the antidegradation policy. For the State's purposes, it also includes the implementation and monitoring plans. [10] The proposed WQO Update Amendment is to revise the water quality objectives for chemical constituents and DO and add a new objective for groundwater toxicity. The addition of a new toxicity objective will not necessarily create a new set of violations that would not have been previously defined as

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such. The state antidegradation policy (Res. No. 68-16) already requires preservation of the best water quality conditions since 1968 where those conditions are better than water quality objectives. Similarly, Resolution No. 92-49 establishes natural background conditions as the cleanup level in cases where it is economically and technologically feasible.

Land application of wastewater could result in groundwater quality impacts through the accumulation of organics, salts, or precipitation of naturally occurring metals in soils. While the fate and transport of pollutants of concern is best understood incorporating site-specific conditions, there is a reasonable and general understanding of how typical pollutants migrate to and through receiving waters. To mitigate this potentially adverse impact, water quality monitoring can be conducted to detect increases in concentrations for constituents of concern, and prevent any additional degradation. A recently published court decision interpreting the application of state antidegradation policy (*Association de Gente Unida por el Agua V Central Valley Regional Water Quality Control Board, (2012) 210 Cal. App.4th 1255 (AGUA)* and gave precedential effect to State Water Board guidance on the application of Resolution 68-16.

Regarding DO, by requiring the implementation of compliance measures that preserve and maintain shade, control sediment, and maintain stream flows supportive of beneficial uses, there will be an overall beneficial impact on water quality in the North Coast Region. The operation of aeration systems for DO have the potential to supersaturate the water column, exceed water quality standards, and lead to accelerated mortality rates of salmonids and other sensitive aquatic organisms. However, this impact can be mitigated by proper design, operation and maintenance, as well as conducting the proper water quality monitoring when implementing structural compliance measures intended to raise levels of DO.

There are special circumstances, however, under which potential significant impacts could occur. For example, the primary environmental impact associated with dam removal or large scale aquatic ecosystem restoration in the short-term (months to years) could result in the discharge of sediments or construction materials that could impact water quality with temporary increases in turbidity, suspended sediment load, organic matter, or remobilization of chemical constituents from contaminated sediments with consequences on dissolved oxygen, water column concentrations of chemical constituents, or toxicity. Such discharges could result in the exceedance of the proposed Basin Plan water quality objectives for DO or chemical constituents in surface water. Short-term water quality exceedances may be acceptable in cases where long-term benefits to be beneficial uses outweigh short-term impacts, based on detailed, site-specific information and findings. However, in the context of the CEQA, such an activity could result in significant and unavoidable impacts to water quality.

HYDROLOGY AND WATER QUALITY: b) Potentially Significant and Unavoidable
Discussion: Remediation efforts that use pump and treat systems can alter the water table. In some cases, the manipulation conducted intentionally so as to prevent pollutant migration. However, each system is installed after the preparation of a remedial action plan which evaluates site characteristics such a soil permeability and transitivity to evaluate the potential for adequate yield. At the point which remedial actions are near approval, most, if not all potential impacts to receptors (such as through drinking water wells, basements, and surface waters) have been identified, located, and assessed for threat of contamination. When pumping and treating is an optional treatment method, pilot tests are performed to confirm the estimated effects of drawdown. If negative affects to water supply wells are noted, it is unlikely the proposed action will be approved for full-scale operation. Operations in such circumstances may only be conducted if the nearby supply wells are in eminent danger of contamination and hydraulic control is necessary. In these cases, the water supply use would already be impacted and the compliance measures would be conducted to support a usable well. Therefore, the impact to water supply wells from soil and groundwater remedial actions is less than significant.

Regarding DO, the alteration of the natural pattern and range of surface water flows as a controllable factor with respect to ambient water temperatures and DO could result in some project proponents seeking alternative water sources. In addition, surface water supplies may be insufficient to meet all future demands, even in the absence of the proposed Basin Plan amendment. Surface water resources are already limited in some areas of the North Coast Region. In those areas, future water supplies will be limited by the natural supply availability rather than restrictions on water diversion and storage. Some streams in the region are already fully appropriated for some or all of the year.

Pumping groundwater instead of diverting surface water could potentially deplete groundwater resources, which could potentially result in a reduction in surface water flows, particularly summer flows, which could affect surface water flows. Additionally, increases in riparian vegetation can in turn lead to increased levels of evapotranspiration thereby reducing stream flows. Reduced surface water flow could potentially harm riparian vegetation or degrade habitat for sensitive species; could potentially adversely affect water temperature and increase constituent concentrations due to reduced dilution; and could potentially adversely affect recreational opportunities. However, these compliance measure are likely reduced to levels less than significant in many cases with the implementation of mitigation measures such planting native vegetation, allowing for thinning of upland vegetation to reduce evapotranspiration, conducting monitoring, and modeling surface water flow rates in conjunction with groundwater extraction as detailed in Section 4.4.3 and Table 4-1.

Depending on the circumstances, switching from surface water diversions to groundwater pumping or diverting water under riparian rights could have a significant adverse impact on biological resources, water quality, or recreation. As discussed below, however, the

possible effects of a user switching from a surface water diversion to a ground water diversion are dependent on a wide range of variables, and therefore it is highly uncertain whether any particular user who may switch to groundwater will cause a delay in surface water flow depletion, whether any such delay will cause a significant reduction in surface water flows, or whether any delayed reduction in flows will have a significant adverse impact on the environment, including DO concentrations.

Surface water flow depletion may continue after groundwater pumping stops because it takes time for groundwater levels to recover from the previous pumping stress and for the depleted aquifer defined by the cone of depression to be recharged with water. Therefore, the time of maximum stream depletion may occur after pumping has stopped. Eventually, the aquifer and stream may return to their pre-pumping conditions. But, the time required for full recovery may be quite long and exceed the total time that the well was pumped. Any time delay may range from a few days in the zone adjacent to the stream to thousands of years for water that moves from the central part of some recharge areas through deeper parts of the groundwater system (Heath, 1983).

The level of significance for a potential impact to hydrology/watery quality attributable to a delay in surface water flow depletion as a result of diverters switching to groundwater pumping or riparian rights, is dependent on site-specific circumstances. In light of the fact that the switch to groundwater or riparian diversions as alternative sources of supply is possible, the potential impacts to hydrology and water quality are identified as significant and unavoidable.

HYDROLOGY AND WATER QUALITY: c), d) and e) Less than Significant with Mitigation Incorporated

Discussion: Placement of physical structures, such as reactive barriers or physical barriers, are intended to alter groundwater hydrology, but these measures are typically used to treat, remediate and protect contamination from reaching potential receptors. Using caps to protect sites has the potential to alter hydrology depending on the nature of the cap design and local precipitation patterns. Some caps are made of impervious materials such as asphalt, concrete, or certain types of membranes. Impervious surfaces decrease the amount of precipitation which is infiltrated by native or uncapped soils. This leads to increased runoff at higher volumes and velocities and can negatively alter streams, causing flooding, erosion, incision and stream degradation. The type, size, and location of caps should be considered in the remedial action or treatment plans. The hydrologic effect of caps should be evaluated in proposed plans and in future project level CEQA analyses.

Wastewater treatment system facilities and groundwater pump and treat systems may move or discharge large volumes of water that could potentially contribute to alterations of hydrology. But, existing Basin Plan discharge prohibitions, as well as the existing NPDES and WDR permit programs address discharge flows for potential adverse effects on water quality and hydrology, and therefore are not likely to contribute to adverse effects.

If a cap is ultimately necessary to protect groundwater, then it must be constructed in a manner that considers site hydrology. For example, BMPs such as bioswales and detention ponds can be designed into a project proposal to reduce peak flow and peak volume storm water discharge rates. Spills, leaks or discharges from the construction of compliance measures could directly affect water quality and indirectly affect waters by polluting storm water runoff. These potential impacts should be addressed in a facility's remedial action plan, treatment plan or storm water pollution prevent plan. Based on the existing requirements to evaluate site-specific hydrology from such proposals, the potentially adverse effects can be mitigated though additional storm water controls.

Infiltration basins, field leveling, road construction, bioengineering, and in-stream restoration are all activities which could potentially cause an alteration of the existing drainage pattern of a site. In most cases however, these compliance measures would be installed with appropriately designed mitigation measures so as to limit any alteration of the existing drainage pattern, unless beneficial to the environment. In general, such compliance measures could be installed without resulting in substantial erosion of siltation on- or offsite. For example, scheduling, straw, seed, silt fence, straw waddle, straw bales, drip protection, vehicle cleaning and maintenance, and site inspections are all methods that can be employed. Permittees are commonly required to install and maintain erosion control measures (e.g. waterbars, rolling dips, mulch, rock rip-rap) to prevent discharge of excess sediment from soil disturbing activities. Similarly, a common requirement is to relocate roads away from unstable and landslide-prone terrain. Roads must be drained away from unstable areas during construction, reconstruction of maintenance activities. New roads must be located on stable ground, to the maximum extent practicable. Other common requirements are to: minimize cut-bank height, avoid placement of fill on steep slopes, use off-channel water collection features for dust abatement purposes, and install adequate number/type of road drainage features to prevent concentration of road runoff. Permittees are always advised to seek professional help (e.g. Natural Resources Conservation Service, local resource conservation district) in developing land management plans and employing observational techniques to ensure optimal stocking rates for rangelands, for example.

HYDROLOGY and WATER QUALITY: f) Less than Significant with Mitigation Incorporated

Discussion: The addition of reducing agents to breakdown contaminates can often and temporarily lead to an increase in more toxic compounds. During the reductive de-chlorination process, metals such as arsenic, manganese, and antimony, may be mobilized in the subsurface. Additionally, the chemical tetrachloroethlyene (PCE), can breakdown to trichloroethylene (TCE), cis-1,2-Dichloroethelene (cis-1,2-DCE) and vinyl chloride (VC). The use of zone injections has also been known to temporarily transform chromium III into the more toxic chromium VI (Cr VI). Although the parent compounds breakdown to the more toxic intermediary VC and Cr VI, this is temporary and the degradation will continue

to occur with further breakdown to non-toxic end products (e.g., carbon dioxide, chloride, Cr III and water). Through the existing regulatory programs, the responsible parties shall comply with monitoring and reporting program orders that contain requirements for groundwater monitoring to evaluate the mobilization of metals and VOCs, and verify the return of pre-treatment water quality conditions minus the groundwater contaminants. Adding reducing agents to groundwater is designed to reduce groundwater toxicity and enhance cleanup of the aquifer. Through proper implementation of remedial actions and careful groundwater monitoring and reporting these potential impacts are less than significant with mitigation incorporated. Additional mitigation measures to reduce impacts to water quality are detailed in Section 4.4.3 and Table 4-1.

HYDROLOGY AND WATER QUALITY: h) and i) Less than Significant with Mitigation Incorporated

Discussion: It is possible that compliance with the proposed WQO Update Amendment could place structures within a 100-year flood hazard area which could impede or redirect flood flows. For example, switching from an in-stream diversion to off-stream water storage site could result in a structure being placed within the flood plain. Additionally, aquatic ecosystem restoration that calls for the breaching lakeshore levees or reservoirs to create diverse habitat features and lower lake levees to create riparian fringe habitat has the potential to adversely affect hydrology and natural flow patterns as well as potentially expose people or structures to flooding. However, it is in these instances that coordination with project proponents and other agencies is best suited to reduce potentially significant impacts.

These types of actions should be analyzed individually under CEQA, on a project by project basis. Such projects should be implemented in a manner so as to avoid, minimize or mitigate potential significant impacts. As presented in section 4.4.3, mitigation measures include proper design, siting, and operational timing to reduce alterations of natural hydrology and adverse effects. Additional mitigation measures include monitoring and modeling flows and proper hydrology to minimize potential adverse effect prior to project implementation. Although there is a possibility that these types of compliance measures could cause an adverse impact, any potentially significant impacts will be avoided or mitigated to less than significant with mitigation incorporated. Additional mitigation measures to reduce impacts to water quality are detailed in Section 4.4.3 and Table 4-1.

HYDROLOGY and WATER QUALITY: g) and j) No Impact

Discussion: None of the proposed compliance measures would result in the placement of housing in a flood plain or tsunami zone, and therefore would not have an adverse impact due to; redirection of flows, floods, dams or levee breaches or that may result in injury or death.

X. LAND USE AND PLANNING - Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?		X		
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?		X		

LAND USE AND PLANNING: a) No Impact

Discussion: None of the compliance measures identified in this Staff Report contemplate the use of non-structural or structural BMPs that would physically divide an established community.

LAND USE AND PLANNING: b) Less than Significant with Mitigation Incorporated

Discussion: In 1992, the state legislature provided an opportunity for more formal groundwater management with the passage of AB 3030[11]. In 2002, SB 1928 was signed into law requiring any public agency seeking state funds administered through Department of Water Resources (DWR) for construction of groundwater projects to prepare and implement groundwater management plans with certain specified components. These plans brought a number of agencies into the groundwater management arena promoting a non-regulatory approach and local oversight. Many cities and counties in the state are involved in groundwater management through the development and implementation of local ordinances or plans designed to address water supply issues. Groundwater management plans under SB 1928 are intended to consider management objectives, protection of water quality, groundwater recharge potential, water conservation, low impact development, and other issues associated with sustainable groundwater use. In the North Coast Region a few municipalities and key stakeholder groups have developed voluntary groundwater management plans in the following locations: the Lower Mad River Area; the Mendocino City Community Service District; Scott Valley; Tule Lake Irrigation District; and the Santa Rosa Plain. In addition, several of the implmenting municipalities are assessing their water supplies, including consideration of groundwater availability.

[11] water code § 10750

An existing method used throughout the state to manage water resources is known as aquifer storage and recovery (ASR). This method uses various techniques (e.g., from infiltration to injection) to actively recharge groundwater aquifers during the wet season for storage and later use in the dry season. For example several local municipalities in the Santa Rosa Plain groundwater basin throughout the region have begun investigating the use of ASR as a tool to help balance water supply needs during the dry season when surface water withdrawls from the Russian River are restricted so as to accommodate the flow needs of threatened and endangered species. There are many ways to implement ASR projects; however, one method currently under consideration includes the injection of potable water through municipal water wells into the underlying aquifer. This method includes the injection of disinfected, potable drinking water into an aquifer for storage, later recapture, treatment and then distribution.

In 2012, the State Water Board adopted Water Quality Order No. 2012-0010 *General Waste Discharge Requirement for Aquifer Storage and Recovery Projects That Inject Drinking Water into Groundwater (*ASR WDR*)*. This Order authorized the discharge of drinking water that has been treated pursuant to the California Department of Public Health (CDPH), now the State Water Board Division of Drinking Water (DDW), domestic water supply permit, which requires disinfection and the maintenance of disinfection by-products in public water supply systems used to eliminate pathogens. However, disinfection by-products such as trihalomethanes, haloacetic acids, bromate, and chlorite can be present in water supplies which are known to have adverse health effects at certain concentrations. This requirement illustrates the balance between known biological (pathogens) and chemical (disinfectants) effects on human health; which the DDW is responsible for overseeing. Additionally, injection of treated drinking water into an aquifer may induce geochemical reactions, some of which may cause exceedance of a water quality objective. For example, the introduction of treated drinking water with a higher concentration of dissolved oxygen into an anaerobic aquifer may induce geochemical oxidation-reduction (or "redox") reactions that may increase concentrations of inorganic compounds in the aquifer and recovered water. The redox reactions may result in higher dissolved concentrations of inorganic constituents in recovered water than in the injected water. Specifically, arsenic, iron, manganese, nitrogen, selenium, and sulfur have been identified as constituents of concern in ASR projects.

Several local municipalities in the North Coast Region have begun to study local conditions and pursue ASR projects that use treated, potable water. While site-specific characteristics and geochemical reactions are not yet known as to how disinfection byproducts will react in the subsurface, the presence of these compounds is reason for caution. Compliance with the proposed chemical constituents and groundwater toxicity objectives will require close consideration of the potential for disinfection byproducts to exceed water quality objectives and impact beneficial uses. The beneficial use of most concern is the domestic well owner who draws drinking water for use untreated. The injection of treated drinking

water into an aquifer which results in the detection of disinfection byproducts in excess of public health goals at domestic drinking water wells could be determined to be a violation of water quality standards, including a violation of the antidegradation policy. But numerous potential techniques exist to ensure continued maintenance of high quality water and protection of human health. For example, treatment of injected water at the wellhead could remove or reduce constituents of concern. Use of alternative disinfection processes (alternatives to chlorination) could reduce the potential that chemicals of concern will impact groundwater quality. ASR projects could be sited only in those locations a reasonable distance from any potential domestic drinking water wells. An ASR project design could include enough water quality monitoring to quickly detect whether or not constituents of concern are migrating in a manner which risks the quality of domestic drinking water wells. The rate, volume and depth of injection could be managed based on the results of groundwater monitoring. With the application of such compliance measures and based on a project-specific evaluation, the proposed WQO Update Amendment does not have a significant adverse effect on local plans, policies or zoning ordinances.

Reliance on alternative water sources, water conservation efforts, preservation of areas of known thermal refugia, preservation of shade, and measures to ensure stream flows could have a conflict with local plans or ordinances that call for an increase through various water supply and/or development projects. Municipal, domestic, agricultural and industrial water supply could be impacted by certain restrictions on the extraction of water from riparian areas or areas of known thermal refugia. Construction or expansion of off-stream water storage facilities could conflict with local plans or ordinances. The development of project-specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and onsite and nearby structures into account can mitigate such adverse impacts. Additionally, ensuring proper design, siting, and operational timing to reduce alterations of natural hydrology and adverse effects on stream and groundwater quality and quality from structural compliance measures can be done in advance with proper planning and site characterization. Therefore, the potential impacts from such compliance measures can be adequately mitigated to levels of less than significant.

LAND USE AND PLANNING: c) Less than Significant with Mitigation Incorporated
Discussion: Depending on the structural compliance measures selected, direct or indirect impacts to existing fish or wildlife habitat may occur; however, any such impact would be temporary. Compliance measures that may not have an impact when implemented in one area could potentially have an impact if they are implemented in a sensitive area. For instance the construction of a compliance measure such as a groundwater remediation facility could be located in an identified habitat conservation area. Therefore, when installing structural compliance that may include substantial earth movement, responsible parties will be required under their applicable permit (or as necessary to comply with applicable prohibitions), to consult with various federal, state and local agencies, including but not limited to the county the project is located in, CDFG and the USFWS. Typically

Regional Water Board staff work with other agencies and project proponents on the development of Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP) to ensure compliance with all regulations.

If appropriate to avoid conflicts with any HCP or NCCP, the timing and/or location of the BMPs may be adjusted to reduce any potential conflict with any such plans. If, however, such adjustments could not be made, the compliance measures would have to be changed to avoid any adverse impacts to rare, threatened or endangered species, or the discharge would not be permitted to occur. Because of these mitigation requirements, conflict with the provisions of an adopted HCP or NCCP is not likely to occur. Therefore the appropriate finding is less than significant with mitigation incorporated. For further details see the previous section discussing biological resources. Additional mitigation measures are detailed in Section 4.4.3 and Table 4-1.

XI. MINERAL RESOURCES -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?			X	
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?			X	

MINERAL RESOURCES: a) and b) Less than Significant

Discussion: None of the compliance measures identified contemplate the use of non-structural or structural BMPs that would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Therefore, the appropriate finding is no impact.

XII. NOISE -- Would the project result in:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?		X		
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?		X		
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?		X		

NOISE: a), b), c) d), e) and f) Less than Significant with Mitigation Incorporated
Discussion: Increased noise levels would likely be associated with heavy equipment operation associated with construction of structural compliance measures. Temporary increases in noise from remediation or treatment system maintenance or upgrades could occur. In addition, noise could be increased temporarily from trucks and heavy equipment during excavations. Additionally, an increase in noise from drill rigs installing monitoring wells, injection wells, or extraction wells or the use of pumps, mixers, and compressors to sample, remediate and treat water could also occur. The use of thermal treatment units/incineration can produce noise above ambient levels. Construction, modification or removal of facilities for the purpose of groundwater or surface water extraction, energy supply and/or recreation could result in short-term and long-term impacts from noise. For the most part, the implementation of structural compliance measures may result in localized increased noise levels that can be minimized or mitigated through project-specific noise control plans.

Noise control plans would need to account for decibels generated from project activities, peak noise working hours, evening working hours, equipment inspections, muffler

inspections, nearby receptors, a compliant resolution process, and an operations contingency plan. For example, noise levels from activities such as construction and/or maintenance would not exceed the existing levels and the loudest activities from other construction actions can be planned during peak daily noise. Additional measures to mitigate noise include advanced notifications to neighboring properties, sound control structures and equipment use buffers. Based on the availability of mitigation measures to abate noise impacts, this effect is considered less than significant with mitigation incorporated.

Upgrades to wastewater treatment facilities could include permanent structural measures that would result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. Additionally, many groundwater cleanup sites have needed remedial treatment actions for several years and even in excess of a decade which could seem like more than just temporary impacts. However, through the availability of structural and non-structural mitigation measures to abate noise impacts, this effect is considered less than significant with mitigation incorporated. Mitigation measures to address potential noise impacts are further detailed in Section 4.4.3 and Table 4-1.

XIII. POPULATION AND HOUSING -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X

POPULATION AND HOUSING: a), b) and c) No Impact

Discussion: None of the compliance measures identified would induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure). None of the compliance measures identified would displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.

The proposed WQO Update Amendment has no effect on parameters that are typically evaluated in addressing potential growth inducement, such as generation of employment opportunities, provision of housing supply, generation of the sale of goods and services, removal of growth obstacles, expansion of infrastructure, or extension of utilities. The proposed Basin Plan amendment would not result in any substantial growth-inducing impacts. Therefore, there is no impact.

XIV. PUBLIC SERVICES				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?		X		
b) Police protection?			X	
c) Schools?			X	
d) Parks?			X	
e) Other public facilities?			X	

PUBLIC SERVICES: a) Less than Significant with Mitigation Incorporated
Discussion: Logically, the increase in riparian vegetation increases the fuel loads for wildfires. While fuel loads do not cause fires, the increasing mass available can increase severity of a fire and could impact the demand on fire protection services. Allowing for the removal or thinning of upland vegetation that has high evapotranspiration rates and increases fire risks could be a mitigation measure that results in multiple benefits to the environment. For more discussion see the section on aesthetics. The appropriate finding is less than significant with mitigation incorporated.

PUBLIC SERVICES: b) c), d) and e) Less than Significant
Discussion: The proposed WQO Update Amendment does not add new residents or change land uses, and therefore would not generate a need for new or additional fire protection, police protection, schools, parks or related services. Minor alterations to government facilities may be required if soil and/or groundwater remediation or wastewater treatment is necessary; however, this would be an existing requirement and there is only a very slight

potential for facility alterations based on the proposed revision to the water quality objectives. Therefore, the potential level of impact is less than significant.

With the widespread increase in marijuana cultivation throughout the region, both local and state law enforcement and resource agencies have seen an increase in the number of cases that lead to enforcement actions. Marijuana cultivation in the region has caused discharges of sediment and pesticides as well as an increased water demand. While many of these operations are legal under California law they are still illegal under federal law. According to Regional Water Board staff, many of these small and state legal operations are seeking input and making attempts to reduce their impacts to environment through routine BMPs that address erosion and sediment control, as well as water efficiency strategies. Still, many more large scale operations go fully beyond the scope law with little caution towards criminal and environmental legality. With observations spanning over the past few decades and special emphasis on the last few years, the demand on law enforcement including the Regional Water Board has already taken place. Moreover, while water quality objectives apply to marijuana growers with respect shade, sediment, and flow, these components do not necessarily implicate police resources. Therefore, a significant increase in the demand for public services has already occurred and the impact from this proposed Basin Plan amendment on police services is less than significant.

XV. RECREATION-- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			X	

RECREATION: a) No Impacts
Discussion: None of the compliance measures identified would increase the use of existing neighborhood and regional parks or other recreational facilities. No impact would occur.

RECREATION: b) Less than Significant
Discussion: It is possible that soil and/or groundwater contamination could occur next to or within a park or recreational facility, which would necessitate the installation of remedial actions or additional wastewater treatment. There could then be minor impacts to the park or recreational facility to conduct cleanup activities or upgrade wastewater

treatment capabilities. However, none of the compliance measures would be necessary to be implemented in such ways that substantially physically deteriorate a recreational facility or require the construction of new recreational facilities. Therefore, the potential impact is less than significant.

XVI. TRANSPORTATION/TRAFFIC -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?		X		
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?		X		
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?		X		
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		X		
e) Result in inadequate emergency access?		X		
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?			X	

TRANSPORTATION/TRAFFIC: a), b), c), d) and e) Less than Significant with Mitigation Incorporated

Discussion: Groundwater investigations and construction activities from remedial system upgrades or upgrades to wastewater treatment plants have the potential to increase traffic volumes, reduce speeds on public roads, and result in temporary lane closures, which could also temporarily affect current levels of service and emergency access. The amount of

traffic would vary on the project-specific basis, depending on the upgrade or investigation needs. As such, it would require analysis on a case-by-case basis. Most potential traffic related impacts are likely to be temporary and associated with construction of additional facilities. Any impacts on traffic associated with increased operation and maintenance of treatment facilities is likely negligible as compared to the existing traffic baseline. Lane closures have the greatest potential to upset traffic patterns and create significant impacts and would require obtaining public right-of-way encroachment permits and the development of a traffic control plan. Traffic control plans include signage locations, though traffic routes, designated truck routs, construction sites access, designated work and staging areas, parking areas, pedestrian and bicycle safety access, detours and lane closures, emergency access routes and detours, and flaggers. Additional mitigation may include nighttime work to avoid heavily congested or commuter areas. Based on the potential traffic impacts and the available mitigation measures, the appropriate finding is less than significant with mitigation. Additional mitigation measures are detailed in Section 4.4.3 and Table 4-1.

Increased tree retention may conflict with the site distance requirements of transportation agencies (public roads) areas designated as clear recovery zones. Different levels of road systems (e.g. freeways, highways, interstates, city streets and county roads) have various levels of design requirements in consideration of site distance to help ensure public safety. In addition, clear recovery zones (areas adjacent to road shoulders) are created and maintained in certain locations outside the highway shoulder to provide an opportunity for vehicles that leave the roadway to come to a safe stop or to return to the roadway. A recoverable slope is a slope on which a motorist may, to a greater or lesser extent, retain or regain control of a vehicle by slowing or stopping. Slopes flatter than 1:4(vertical/horizontal) are generally considered recoverable (U.S. Federal Highway Administration).

Thousands of miles of roads either parallel or intersect streams, riparian areas and/or floodplains. Therefore, it is possible that retaining riparian vegetation to provide site potential shade or the installation of sediment control compliance measures could infringe upon site distance or clear recovery zone requirements. However, with proper planning and coordination with local, county and state transportation agencies most conflicts could be resolved. For instance, during the road planning, design and environmental impact assessment stages, these types of constraints or conflicts are analyzed by transportation engineers and biologists. Through the existing project planning, CEQA process, interagency coordination and existing regulation (NPDES storm water permits and 401 Certifications) potential conflicts are resolved by avoidance, minimization, or offsite compensatory mitigation. For example, many structural BMPs designed to reduce sediment and polluted storm water runoff has often been determined to be possible to construct, but infeasible due to safety constraints. Alternately, adequately vegetated slopes flatter than 1:4(vertical/horizontal) are also potential locations for structural BMPs such as biofiltration of polluted storm water and are known to reduce erosion and sediment

transport. Through proper coordination, planning and design clear recovery zones can meet public safety, storm water treatment, and erosion and sediment control goals. Therefore, it is staff's determination that the potential impacts are less than significant with mitigation incorporated.

TRANSPORTATION/TRAFFIC: f) Less than Significant

Discussion: The proposed project does not involve air traffic or require the installation of hazardous design features on roads. The proposed project will not conflict with policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. Because the proposed project does not involve these elements, the appropriate finding is no impact.

XVII. UTILITIES AND SERVICE SYSTEMS -- Would the project:				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			X	
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?		X		
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?		X		
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?		X		
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			X	
g) Comply with federal, state, and local				

statutes and regulations related to solid waste?				X

UTILITIES AND SERVICE SYSTEMS: a) and f) Less than Significant
Discussion: The proposed WQO Update Amendment itself will not exceed applicable wastewater treatment requirements. WDRs and NPDES permits are already implementing more stringent objectives than those listed in the Basin Plan for chemical constituents and groundwater toxicity, which are based on current Title 22 regulations, Basin Plan Table 3-2 footnote 2, the SIP, the antidegradation policy and SWRCB Resolution 92-49. In theory the numeric values of the water quality objectives for chemical constituents and groundwater toxicity will be changed. However, in current practice the numeric values used in permits, orders and other regulatory actions are derived through the applications of various plans policies as mentioned above. For example the SIP and antidegradation policy is and will be the guiding policy for the development of effluent limitations in NPDES permits. Additionally, SWRCB Resolution 92-49 and the antidegradation policy will be the predominant guiding policies for groundwater cleanup and protection efforts.

In the absence of a toxicity objective for groundwater, Regional Water Board staff has relied on alternative justifications and authority for establishing cleanup levels and permit limits to address toxic constituents of concern, such as the federal and state antidegradation policies and State Water Board Order No. 92-49. Adopting a specific groundwater toxicity objective will provide a sounder and more transparent regulatory standard to address the cleanup of toxic substances in groundwater. However, it will not significantly alter the limits in permits, orders, and other regulatory actions as compared to that which is currently produced by cleanup staff using alternative justifications. This argument also holds true for the generation of any waste byproduct in need of disposal.

The revision of the chemical constituents objective for surface water and groundwater also results in bringing the Basin Plan up to date with the Regional Water Board's longstanding interpretation of the language. For example, the outdated numeric criteria in Table 3-2 are typically not used in permits, orders, or other regulatory actions. Instead, footnote 2 to Table 3-2 is interpreted to mean that any more stringent criteria appropriate for the protection of sensitive beneficial uses can be used when establishing a permit, order or other regulatory action. Similarly, the combination of footnote 2 and application of the groundwater toxicity objective for surface water, often lead staff to the development of numeric criteria that protect not only the MUN beneficial use, but other beneficial uses such as aquatic life and human consumption of aquatic organisms, as is otherwise required under Porter-Cologne.

In addition to the narrative groundwater toxicity objective, and the revision of the chemical constituents objective for surface water and groundwater, the WQO Update Amendment removes other obsolete information and revises existing language so as to make the Basin Plan more consistent with current Regional Water Board practice. As above, these changes

will have no impact on how existing regulatory programs are implemented. Therefore, the impact is less than significant.

UTILITIES AND SERVICE SYSTEMS: b), c) and d) Less than Significant with Mitigation Incorporated

Discussion: There is the potential that the proposed Basin Plan amendment could result in the need to upgrade a wastewater treatment plant as happens from time to time when federal or state water quality standards change or treatment capabilities improve. But, there may be many options to consider prior to deciding on the need for structural upgrades. The specific constituents of concern, the discharge locations and flow restrictions, influent concentrations, effectiveness of source controls, as well as many other factors must be taken into account when determining the proper method of compliance. If expansions occur for any variety of reasons, including the need for additional treatment capabilities to meet water quality standards, then construction type impacts are likely to occur as described above, including mitigations to reduce the impacts to less than significant. Construction, expansion, or installation of many of the compliance measures described above have the potential to adversely affect air quality, sensitive biological species, fill wetlands or streams, produce hazardous substances, result in soil erosion, create noise and affect traffic depending on the treatment plant's upgrade needs. But generally speaking, these issues can be mitigated as discussed in the previous sections. Therefore, the appropriate finding is less than significant with mitigation.

Several compliance measures including, but not limited to, sediment control basins, LID features, irrigation systems and tailwater management systems designed to reduce sediment transport to streams have the potential to cause an impact on utilities. However, mitigation measures can reduce any impacts to a less than significant level. Additional mitigation measures are detailed in Section 4.4.3 and Table 4-1.

Should compliance with the proposed Basin Plan amendment require a reduction in surface water withdrawls and a greater reliance on groundwater or alternate water sources, then there could be impacts on the existing water and energy delivery systems. The degree of impact would depend on which compliance measures are implemented, the local hydrology, and other factors. In addition, surface water supplies may be insufficient to meet all future demands even in the absence of any impacts derived from implementation of the proposed Basin Plan amendment. Surface water resources are already limited in some areas and future water supplies will be limited by the natural supply availability rather than by restrictions on water diversion and storage. Some streams in the region area are already fully appropriated for some or all of the year. The selection of the appropriate compliance measures by responsible parties will need to take into consideration their existing water resources. Basing selection of compliance measures on existing water resources will prevent the need to seek new water rights.

Another alternative water supply practice for water purveyors currently being considered in the North Coast Region is groundwater banking, also known as ASR. With potential restrictions on municipal water supplies there is the potential for ASR projects to become more common place throughout the region. There are potential adverse environmental impacts associated with these types of projects. But, there are potential environmental benefits worthy of evaluation on a case-by-case basis.

UTILITIES AND SERVICE SYSTEMS: e) and g) No Impact
Discussion: None of the potential compliance measures have any potential to increase the need for storm water facilities, change the demand on water supplies, require additional capacity for wastewater treatment, or conflict with any solid waste disposal regulation. No impact.

XVII. MANDATORY FINDINGS OF SIGNIFICANCE				
	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		X		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	X			
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X		

Many of the projects that might be undertaken by affected persons as a result of the Policy would be subject to a project-level CEQA review conducted by the Regional Water Board or by another lead agency, which would entail project-specific identification and mitigation of any significant environmental effects. In addition, other regulatory mechanisms can be expected to provide opportunities for minimizing and avoiding significant environmental effects. Regulatory requirements and mitigation measures are described throughout this chapter of the Staff Report and summarized in this document. These regulatory requirements and mitigation measures are likely to reduce many, but not all, of the potential impacts of the Basin Plan Amendment to less than significant levels. In some cases it may not be possible to mitigate the impacts of the Policy to a less-than-significant level

MANDATORY FINDINGS OF SIGNIFICANCE a) Less than Significant with Mitigation Discussion: The proposed WQO Update Amendment does have the potential for significant adverse effect on the environment. While impacts requiring mitigation measures could potentially occur, the compliance measures are for the purpose of reducing pollution concentrations discharged to waters and remediating contaminated waters to levels that protect all beneficial uses, including agricultural water use, municipal and domestic water use, wildlife habitat and rare, threatened and endangered species. However, as noted in the analysis above the compliance measures identified do have the potential to degrade fish and wildlife habitat. Additionally, several of the compliance measures could restriction the range of rare and endangered plants.

All of the compliance measures identified in this environmental analysis are designed to improve water quality. However, compliance measures that require substantial earth movement will likely require consultation with federal, state and local agencies, including but not limited to the county the project is located in, CDFW and the USFWS. Specific mitigation measures will be required by these agencies so as to avoid impacts to rare, threatened or endangered species.

Potential restrictions in range or impacts to fish or wildlife habitat from compliance measures identified in the Staff Report include:

- The removal of surface water impoundments could result in a short term violation of water quality standards as sediments and organic rich waters flow downstream.
- The removal of on-stream and off-stream storage facilities, dams, and construction of minimum bypass flow and fish passage structures could result in changes to hydrology in streams as well as short term violation of water quality standards.
- Switching from on-stream storage facilities to springs, seeps or groundwater as potential water sources could reduce the input of cold water and could results in impacts to areas of thermal refugia.
- Risk of introducing invasive species thorough pasture, hay, rangeland planting and management and stream or riparian restoration.

- Risk of conflict between site potential shade and requirements of sensitive flora or fauna.
- Phytoremediation and constructed wetlands could result in bioaccumulation of toxic compounds if primary producing organisms became prey for threatened or endangered species.
- Phytoremediation and constructed wetlands could result in the transfer of contaminants across media from soil and water to air.
- Operations of aeration systems for DO have the potential to supersaturate conditions, exceed water quality standards and lead to accelerated mortality rates of salmoninds.
- Short term construction, stream dewatering or diversions, turbidity discharges from construction actives or in-stream dam removal, stream and/or riparian restoration.
- Several species of fauna (e.g., snakes, fish, salamanders, and birds) have been entrapped or tangled in erosion control products such as the plastic casing covering straw waddles, or from the monofilament fibers from silt fences that are either in place on active
- Loss of wetlands habitat from repair of leaky conveyance systems or alteration of irrigation practices.
- Loss of critical habitat from sediment discharges.
- Loss of warm water habit for non-native species.
- Switching from on-stream storage facilities to springs, seeps or groundwater as potential water sources could reduce the input of groundwater to surface waters and could results in impacts to areas of thermal refugia
- Reduction in surface flows through groundwater extraction or increased reliance on riparian rights could degrade riparian and special status species habitat
- Construction or reservoir removal has the potential to significantly impact water quality from the release of increased loads of fine grained sediment degrading aquatic ecosystem habitat.

The adoption of the proposed WQO Update Amendment should result in improved water quality in the North Coast Region and will have a significant beneficial effect on the environment over the long-term; however, it should be noted that compliance measures do have the potential to adversely impact the environment. In most cases, the impacts of installing structural compliance measures will be temporary, and many likely can be avoided by adjusting the timing and/or location so as to take into account any candidate, sensitive, or special status species or their habitats. Therefore, with correctly implemented mitigation measures these impacts are considered less than significant. For a detailed list of potential mitigation measures see Section 4.4.3 and Table 4-1.

MANDATORY FINDINGS OF SIGNIFICANCE b) Potentially Significant and Unavoidable Discussion: Cumulative impacts, defined in section 15355 of the CEQA Guidelines, refer to two or more individual effects, that when considered together, are considerable or that increase other environmental impacts. Cumulative impact assessment must consider not

only the impacts of the proposed Basin Plan amendment, but also the impacts from other Basin Plan amendments, municipal and private projects which have occurred in the past, are presently occurring, and may occur in the future in the watershed during the period of implementation.

Impacts associated with implementation of most of the structural measures will be short-term, temporary and spatially distributed across a watershed or region, and will not have significant adverse effects on the environment. Compliance measures that involve substantial earth movement could have potentially significant cumulative impacts. However, many of these activities will be regulated under existing State and Regional permits. Regional Water Board staff's engagement in these regulatory programs will provide an opportunity to limit the potential for cumulative impacts by ensuring that multiple projects proposing implementation of BMPs with the potential to cause short-term impacts are phased appropriately to limit potential cumulative impacts.

Based on a review of the available information, and as a result of implementing the range of compliance measures from the preservation of shade to sediment controls and the modification of water supply to the potential expansion of wastewater treatment and groundwater remediation facilities, it has been determined that significant and unavoidable impacts to the environment have the potential to occur. In most cases these are impacts that are potentially widespread or common throughout the region, and could lead to cumulative watershed and/or region-wide impacts. Cumulative impacts are especially significant in areas that are already listed as impaired or otherwise degraded since the system or species has already lost resilience to external stressors. Due to the fact that many streams in the region are impaired and several rare, threatened and endangered are present throughout the region any adverse impact that has the potential to occur in multiple instances could be considered significant and unavoidable. Many of the potential impacts discussed below and throughout this analysis can be reduced through proper implementation of mitigation measures; however, cumulatively these impacts do have the potential for significant adverse effects on the environment.

- The removal of surface water impoundments could result in a short term violation of water quality standards as sediments and organic rich waters flow downstream.
- The removal of on-stream and off-stream storage facilities, dams, and construction of minimum bypass flow and fish passage structures could result in changes to hydrology in streams as well as short term violation of water quality standards.
- Switching from on-stream storage facilities to springs, seeps or groundwater as potential water sources could reduce the input of cold water and could results in impacts to areas of thermal refugia.
- Risk of introducing invasive species thorough pasture, hay, rangeland planting and management and stream or riparian restoration.
- Risk of conflict between site potential shade and requirements of sensitive flora or fauna.

- Several species of fauna (e.g., snakes, fish, salamanders, and birds) have been entrapped or tangled in erosion control products such as the plastic casing covering straw waddles, or from the monofilament fibers from silt fences that are either in place on active
- Loss of wetlands habitat from repair of leaky conveyance systems or alteration of irrigation practices.
- Loss of critical habitat from sediment discharges.
- Pump and treat systems could result in a lower of the groundwater table or an alteration of hydrology by impeding the natural groundwater gradient.
- Pump and treat systems could alter a sites hydrology and adversely affect nearby streams, riparian areas or wetlands.
- Pump and treat systems could result in the alteration of nearby stream hydrology adding to the total flow in the stream.
- Land application of wastewater could result in groundwater quality impacts through the accumulation of organics, salts, or precipitation of naturally occurring metals in soils.
- Reduction in stream flows due to the increase in evapotranspiration from increased riparian tree retention.
- Temporary sediment discharges that exceed water quality objectives from construction and/or restoration activities.
- Excessive use of rip-rap or stream stabilization structures intended to beneficially affect flow could alter conditions downstream.
- Increased risk of soil or groundwater contamination with concentrated minerals, salts, or persistent pesticides.

Most of these potential impacts are expected to be short-term. Individual project-specific CEQA review will be necessary in those cases as appropriate. Many can and will be mitigated to less than significant levels with the implementation of specific mitigation measures. However, because of the programmatic nature of this CEQA analyses, it is not possible to say with certainty that all impacts will be mitigated to less than significant levels. Identified mitigation will become enforceable in permits and other orders by the Regional Water Board, but we cannot be certain that other agencies will adopt the recommended mitigation for activities under the jurisdiction of other agencies. As a result, even impacts identified as less than significant with mitigation incorporated must also be considered unavoidable at this time.

Notwithstanding the potential negative affects discussed above and throughout this Staff Report it is likely that long-term beneficial effects will be realized on aesthetic resources, biological resources, geology and soils, GHG emissions, hydrology and water quality, and recreation.

MANDATORY FINDINGS OF SIGNIFICANCE c) Less than Significant with Mitigation

Discussion: The purpose of updating and revising water quality objectives, specifically chemical constituents and groundwater toxicity, are to protect human health as well as aquatic ecosystem health. Additionally, water quality objectives are in place to protect human health and the environment. Some of the compliance measures do have the potential to adversely affect humans such as noise from construction, or hazardous construction or remediation project conditions.

Unsightly views of additional wastewater treatment ponds, waste management/treatment units, reservoir or stream aeration structures could degrade the scenic view of a site. Thermal destruction incinerators or phytoremediation actions could produce off-gas requires treatment by an air pollution-control system to remove particulates and neutralize and remove acid gases (e.g. HCl, NO_x, and SO_x). Additionally, exposure to hazardous liquids, solids or gases from construction, demolition or remedial actions presents a potential danger to humans. However, these measures are mitigated through careful project-specific planning, assessment, and preparation or such mitigation measures as noise control plans, best management practices, health and safety plans and trainings. Additional, mitigation measures are listed in Section 5.4.3 and Table 5-1 of this Staff Report.

As explained previously, the proposed WQO Update Amendment is designed to improve long-term water quality by providing a regulatory program designed to protect and restore water quality and the beneficial uses of water in the North Coast Region. An important objective of the proposed WQO Update Amendment is the restoration of a healthy and viable salmonid fishery and the preservation of high quality waters. Finally, the adoption of a groundwater toxicity objective is based on the need to protect the beneficial use of individual domestic water supplies from potential continents that can cause toxicity in humans.

4.6 Alternative Means of Compliance

The CEQA requires an analysis of reasonably foreseeable alternative means of compliance with the rule or regulation, which would avoid or eliminate the identified impacts[12]. The responsible parties can use the structural and non-structural compliance measures described in Section 5.4.1 and 5.4.2 and Table 5-1, or other structural and non-structural compliance measures, to control and prevent pollution, and meet the requirements of the proposed Basin Plan amendment. The alternative means of compliance consist of the different combinations of structural and non-structural compliance measures that the responsible parties might use to meet their permit limits and achieve compliance with the water quality standards. Because there are innumerable ways to combine compliance measures, all of the possible alternative means of compliance cannot be discussed here.

[12] Cal. Code Regs., tit. 14, § 15187 sudb. (c)(3).

However, because most of the adverse environmental effects are associated with the construction of structural compliance measures related to earth movement or construction of infrastructure (e.g., wastewater and groundwater treatment facilities, fencing, off-channel water facilities, aquatic ecosystem restoration restoration) to avoid or eliminate impacts, project proponents should always maximize the use of non-structural measures to the extent feasible, and design structural compliance measures to take into consideration site-specific conditions to minimize environmental effects.

TABLE 4-1
WATER QUALITY OBJECTIVE UPDATE AMENDMENT
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POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Construction, installation, and operation of soil/groundwater remediation, wastewater treatment facilities, and reservoir or stream aeration structures Preserve, maintain, and restore site specific potential shade Measures to address tailwater and surface water impoundments Preservation of existing cold water resources Measures to Restore and Maintain Stream Flows	Aesthetics	Degraded visual character of a site. Unsightly views of additional wastewater treatment ponds, waste management/treatment units, reservoir or stream aeration structures Decreased views or unsightly presence in a scenic vista due to the installation of additional mitigation or remediation equipment or associated material storage necessary to cleanup spills, unauthorized releases, treat wastewater, physically address DO. Potential glare from ponds or unsightly water facilities	AesMM-1: Building storage facility structures or fences to contain equipment or materials. AesMM-2: Proper siting, constructing berms or excess freeboard around the perimeter of a ponds or waste management unit. AesMM-3: Planting vegetation such as native trees, grasses, and forbs.	Less than significant with mitigation
Preserve, maintain, and restore site specific potential effective shade Erosion and sediment control		Decrease scenic views of waterbodies through the retention or planting of vegetation.	Not applicable	Less than significant
Preserve, maintain, and restore site specific potential effective shade	Agriculture	Potential conflict with or conversion of prime agricultural land or land subject to the Williamson Act from implementing grazing restrictions, riparian buggers or riparian restoration. Municipal, domestic, agricultural and industrial water supply could be	AGRMM-1: Coordination between project proponents, Regional Water Board staff and other local, state and federal agencies to achieve site specific potential shade, nutrient load reductions, areas of thermal refugua, and attempt to ensure the preservation of agricultural lands.	Potentially significant and unavoidable with mitigation

TABLE 4-1
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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Riparian buffers and grazing restrictions Preservation of existing cold water resources Measures to Restore and Maintain Stream Flows Erosion and sediment controls Measures to address tailwater and surface water impoundments		impacted by certain restrictions on the extraction of water from riparian areas or areas of known thermal refugia. Switching from surface water diversions to groundwater pumping could lower water table, reduce soil moisture, contribute to land subsidence and reduce aquifer storage capability. Regulation on water use could lead to the conversion of agricultural lands.		
Construction, installation, and operation of soil/groundwater remediation, wastewater treatment facilities, and reservoir or stream aeration structures Aquatic Ecosystem Restoration Preservation of existing cold water resources Measures to Restore and Maintain Stream Flows	Air Quality	Construction-related emissions could include exhaust from construction equipment and fugitive dust from land clearing, earthmoving, movement of vehicles, and wind erosion of exposed soil during reservoir construction or removal, stream and/or riparian restoration. Increased emissions or gases from the expansion and/or extended operation and maintenance of remedial action facilities. Potential odors from stagnant water in sediment basins or ponds. Potential increase in emissions from transportation of soil and groundwater for offsite disposal. Thermal destruction incinerators or phytoremediation actions could produce off-gas requires treatment by an air pollution-control system to remove particulates and neutralize and remove acid gases (HCl, NO_x, and SO_x).	AQMM-1: Air Quality Control Plans ▪ Monitoring and Reporting ▪ Dust control ▪ Avoid days or poor air quality ▪ Monitor levels and cease work prior to exceeding standards ▪ Retrofit equipment ▪ Use low emissions vehicles when possible ▪ Schedule work to reduce the use of high emission vehicles. ▪ Contingency Plans for AQ Violations AQMM-2: Particulate matter and gas removal systems • Baghouses, scrubbers, and wet electrostatic precipitators; packed-bed scrubbers and spray driers.	Less than significant with mitigation

TABLE 4-1
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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Erosion and sediment control Soil and groundwater cleanup/thermal destruction				
Soil and groundwater cleanup Preservation of existing cold water resources Measures to Restore and Maintain Stream Flows		Potential increase in emissions from transportation of soil and groundwater for offsite disposal. Alternative water supplies or increased pumping could result in long term increase in greenhouse gases. Potential byproducts include airborne hydrogen sulfide, vinyl chloride, methane, ethane, and ethene.	NA	Less than significant
Construction, installation, and operation of soil/groundwater remediation, wastewater treatment facilities, and reservoir or stream aeration structures Grazing management plan Preserve, maintain, and restore site specific potential effective shade Rangeland planting	Biological Resources	Risk of introducing invasive species thorough pasture, hay, rangeland planting and management and stream or riparian restoration. Risk of conflict between site potential shade and requirements of sensitive flora or fauna. Phytoremediation and constructed wetlands could result in the transfer of contaminants across media from soil and water to air. Phytoremediation and constructed wetlands could result in bioaccumulation of toxic compounds if primary producing organisms became prey for threatened or endangered species. Operations of aeration systems for DO have the potential to supersaturate conditions, exceed water quality standards and lead to accelerated mortality rates of salmoninds. Short term construction, stream dewatering or diversions, turbidity discharges from construction actives or in-stream dam removal, stream and/or riparian restoration. Several species of fauna (e.g., snakes, fish, salamanders, and birds) have been entrapped or tangled in erosion control products such as the plastic casing	BRMM-1: Consult the applicable state and federal resource protection agencies BRMM-2: Delineate and avoid any project specific environmental sensitive areas. BRMM-3: Species specific work windows to avoid contact or disturbances. BRMM-4: Compensatory mitigation to create, replace, or restore filled or modified waters of the U.S. (streams and wetlands). BRMM-5: Remedial action plans proposing phytoremediation would need to evaluate the potential for bioaccumulation of toxic compounds and select plans species that will not become primary producers in the food chain. BRMM-6: Use certified weed-free grass and seed mix to prevent the introduction of invasive species. BRMM-*7:* Select appropriate or alternate structural BMPs such as bio-degradable, synthetic free or earthen material BMPs. Implement non-structural BMPs such as scheduling, proper design and the removal of temporary BMPs for erosion and sediment controls after stabilization and or project completion.	Less than significant with mitigation

TABLE 4-1
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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Reservoir or stream aeration structures Phytoremediation Constructed Wetlands Erosion and sediment control Measures to Restore and Maintain Stream Flows		covering straw waddles, or from the monofilament fibers from silt fences that are either in place on active Loss of wetlands habitat from repair of leaky conveyance systems or alteration of irrigation practices. Loss of critical habitat from sediment discharges. Loss of warm water habit for non-native species. Reduction in surface flows through groundwater extraction or increased reliance on riparian rights could degrade riparian and special status species habitat	BRMM-8: Developing species relocation plans or interpreting natural site vegetative conditions to include sensitive flora. BRMM-9: Water drafting protocols • Consult CA Fish and Wildlife • Consult SWRCB – Water Rights • Use water diversion fish screens • Velocity dissipaters • Habitat surveys • Stream buffers AQMM-1: Air Quality Control Plans • Monitoring and Reporting • Contingency Plans for AQ Violations H/WQMM-1: Develop storm water pollution prevent plans. H/WQMM-2: Water Quality Monitoring H/WQMM-3: Develop project specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and on-site and nearby structures into account. H/WQMM-4: Implement flow rate modeling, monitoring, prohibitions and restrictions within specific Regional Water Board permits and orders. H/WQMM-5: Plant native vegetation that has evolved with the natural environment. Allow for the removal or thinning of upland vegetation that has high evapotranspiration rates and increases fire risks.	
Construction and installation of soil/groundwater remediation and wastewater treatment facilities Well installation	Cultural Resources	Construction disturbance from earth moving.	CRMM-1: Consult with Tribes, historical societies, federal, state and local agencies regarding location of cultural resources prior to use of heavy equipment in areas with known or suspected cultural resources. Projects subject to the jurisdiction of the Water Boards will be required to comply with Public Resource Code section 21159. This is expected to ensure the implementation of necessary project specific actions to avoid, minimize and mitigate any impacts to historical, archaeological, and paleontological resources or site, or unique geologic features. All future actions must comply with the CEQA process and requirements for tribal consultation provided by	Less than significant with mitigation

TABLE 4-1
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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Excavation Physical barriers Ponds and lagoon construction Aquatic Ecosystem Restoration Erosion and sediment control Measures to address tailwater and surface water impoundments Preservation of existing cold water resources Measures to Restore and Maintain Stream Flows			Senate Bill 18 (SB 18) (State 2004, Ch 905) and Government Code section 65252.	
Construction, installation, and operation of soil/groundwater remediation facilities Well installation Excavation Physical barriers Ponds and lagoons Aquatic ecosystem restoration	Geology and Soils	Implementation of compliance measures such as wells, ponds, trenches, excavations and other treatment facility expansions that involve construction may result in temporary ground disturbances that cause erosion. Soil excavation and trenching could result in erosion or soil collapse. Installation of remedial/treatment facilities on expansive soils. Potential soil erosion from disturbed areas associated with stream stabilization, stream bank revegetation, culvert replacement, stream crossing construction, large woody debris placement. Construction activities or poorly designed facilities could results in short term and long term erosion, and could results in soils compaction reducing soil moisture and biological functions.	H/WQMM-1: Develop storm water pollution prevent plans. GSMM-1: Include erosion control measures in facility pollution prevent plans, remedial action plans, or site health and safety plans. H/WQMM-3: Develop project specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and on-site and nearby structures into account.	Less than significant with mitigation

TABLE 4-1
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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Erosion and sediment control Preservation of existing cold water resources Measures to Restore and Maintain Stream Flows				
Construction, installation, and operation of soil/groundwater remediation, wastewater treatment facilities, and variable outlet structures Upgrade or expansion of waste water treatment facilities Reservoir or stream aeration structures Measures to restore and maintain stream flows	Hazards and Hazardous Materials	Accidental spill or release of materials which have been removed from soil and or groundwater though a remediation or treatment action or from the construction of such facilities. Natural attenuation if not monitored correctly could result allow the migration of hazardous substances. In-situ and ex-situ physical, chemical and thermal remediation or treatments, by design, have the potential to create byproducts or mobilize pollutants in air, soil, and water. Physical, chemical and biological treatment of wastewater has the potential to create byproducts or mobilize pollutants in air and water. Increased amounts of compressed oxygen or generators that require fuels to operated.	H/WQMM-1: Storm Water Pollution Prevent Plans H/WQMM-2: Water Quality Monitoring H/WQMM-3: Develop site specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and on-site and nearby structures into account. AQMM-1:Air Quality Control Plans • Monitoring and Reporting • Contingency Plans for AQ Violations HHMMM-1: Project specific health and safety plans	Less than Significant with mitigation
Measures to address tailwater and surface water impoundments Preservation of existing cold water resources	Hydrology/ Water Quality	The increase in groundwater extraction could reduce surface water flows and result in increased pollutant concentration due to less dilution. The removal of surface water impoundments could result in a short term violation of water quality standards as sediments and organic rich waters flow downstream.		Potentially significant and unavoidable

TABLE 4-1
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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Measures to Restore and Maintain Stream Flows		The removal of on-stream and off-stream storage facilities, dams, and construction of minimum bypass flow and fish passage structures could result in changes to hydrology in streams as well as short term violation of water quality standards. Switching from on-stream storage facilities to springs, seeps or groundwater as potential water sources could reduce the input of cold water and could results in impacts to areas of thermal refugia.		
Construction, installation, and operation of soil/groundwater remediation, wastewater treatment facilities, and variable outlet structures Upgrade or expansion of waste water treatment facilities Well installation Excavation Physical barriers Settling ponds Aeration ponds Preserve, maintain, and restore site specific potential shade Reservoir or stream aeration structures	Hydrology/ Water Quality	Spills, leaks or discharges from the construction of compliance measures could directly affect water quality and indirectly affect waters by polluting storm water runoff. Soil excavations, compost operations or land farming could result in erosion, sedimentation of nearby waters. During the reductive de-chlorination process, metals, such as arsenic, manganese and antimony, may be mobilized in the subsurface. PCE is reductively de-chlorinated to Trichloroethylene (TCE), cis- and trans-1,2-DCE and vinyl chloride (VC). Ozone injection can cause chromium III to turn to chromium VI. Fracturing hydraulically separate zone could lead to cross contamination of uncontaminated aquifers, water bearing zones, or nearby surface waters. Pump and treat systems could result in a lower of the groundwater table or an alteration of hydrology by impeding the natural groundwater gradient. Pump and treat systems could alter a sites hydrology and adversely affect nearby streams, riparian areas or wetlands. Pump and treat systems could result in the alteration of nearby stream hydrology adding to the total flow in the stream. Land application of wastewater could result in groundwater quality impacts through the accumulation of organics, salts, or precipitation of naturally occurring metals in soils.	H/WQMM-1: Develop storm water pollution prevent plans. H/WQMM-2: Water Quality Monitoring H/WQMM-3: Develop site specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and on-site and nearby structures into account. Ensure proper design, siting, and operational timing to reduce alterations of natural hydrology and adverse effects on stream and groundwater quality and quality from structural compliance measures. • Install and maintain erosion control measures (e.g. waterbars, rolling dips, mulch, rock rip-rap) to prevent discharge of excess sediment from soil disturbing activities. • Relocate roads away from unstable and landslide prone terrain. Drain roads away from unstable areas during construction, reconstruction of maintenance activities. Locate new roads on stable ground to the maximum extent practicable. • Minimize cutbank height and avoid placement of fill on steep slopes. Use off-channel water collection features for dust abatement purposes. • Install adequate number/type of road drainage features to prevent concentration of road runoff. • Seek professional (e.g. Natural Resources Conservation Service, local resource conservation district) in developing land management plans and observational techniques to ensure optimal stocking rates for rangelands. • Protect drainage channels from sediment contributions with	Less than Significant with Mitigation

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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Aquatic Ecosystem Restoration Erosion and sediment control Measures to address tailwater and surface water impoundments Preservation of existing cold water resources Measures to Restore and Maintain Stream Flows		Reduction in stream flows due to the increase in evapotranspiration from increased riparian tree retention. Temporary sediment discharges that exceed water quality objectives from construction and/or restoration activities. Excessive use of rip-rap or stream stabilization structures intended to beneficially affect flow could alter conditions downstream. Work within and adjacent to waters increases the risk of leaking equipment or hazardous material spills, short term turbidity increases and/or discharges of settable solids. Breaching lakeshore levees to create diverse habitat features and lower lake levees to create riparian fringe habitat has the potential to adversely affect hydrology and natural flow patterns. Operations of aeration systems for DO have the potential to supersaturate conditions, exceed water quality standards and lead to accelerated mortality rates of salmoninds. Decrease stream flows and/or aquifer storage from dust abatement. Alterations of natural hydrology and increases in stream temperatures by concentrating or redirecting road runoff. Increased risk of soil or groundwater contamination with concentrated minerals, salts, or persistent pesticides. Increased risk of erosion and sedimentation from the construction of trails, stream crossings, and riparian grazing. Increase risk of groundwater contamination of petroleum hydrocarbons and metals from the infiltration of storm water runoff	vegetated buffers, wattles or similar erosion control devices. • Plant a cover crop on exposed soil to reduce the length of time in which soil is exposed to wind and water. Cover exposed soil that will not receive immediate planting with straw or other suitable erosion control material. • Use precision (site specific) farming techniques; monitor chemical condition of soil, water, and plant residuals carefully prior to applying fertilizers, pesticides, or water, including tailwater. • Leach soils within the root zone as necessary to prevent salt build up in that portion of the soil profile. • Avoid introduction of storm water into tailwater system to prevent impacts to storm water. • Maintain filter strips between fields and surface water to prevent discharge of tailwater directly into surface waters. • Don't concentrate drainage such that toxic levels of constituents are discharge to waters. H/WQMM-4: Implement flow rate modeling, monitoring, prohibitions and restrictions within specific Regional Water Board permits and orders. H/WQMM-5: Plant native vegetation that has evolved with the natural environment. Allow for the removal or thinning of upland vegetation that has high evapotranspiration rates and increases fire risks. USSMM-3: Plan for and develop conservation and efficiency projects for water supply. Plan for and develop recycled water projects and aquifer storage and recovery (ASR) projects.	
Construction, installation, and operation of soil/groundwater remediation facilities	Land Use Planning	Installation or expansion of remediation or treatment facilities may have a potential for direct and indirect impacts to a candidate, sensitive, or special status species or their habitat and could conflict with applicable conservation plans.	BRMM-1: Consult the applicable state and federal resource protection agencies BRMM-2: Delineate and avoid any project specific environmental sensitive areas.	Less than Significant with Mitigation

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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Preserve, maintain, and restore site specific potential shade Preservation of existing cold water resources Measures to Restore and Maintain Stream Flows		Reliance on alternative water sources, water conservation efforts, and preservation of areas of known thermal refugia could have a conflict with local plans or ordinances that call for an increase through various water supply and/or development projects. Municipal, domestic, agricultural and industrial water supply could be impacted by certain restrictions on the extraction of water from riparian areas or areas of known thermal refugia. Construction or expansion of off-stream water storage facilities could conflict with local plans or ordinances. The groundwater toxicity objective could present a conflict with groundwater management strategies such as aquifer storage and recovery	BRMM-3: Species specific work windows to avoid contact or disturbances. BRMM-4: Compensatory mitigation to create, replace, or restore filled or modified waters of the U.S. (streams and wetlands). BRMM-5: Remedial action plans proposing phytoremediation would need to evaluate the potential for bioaccumulation of toxic compounds and select plans species that will not become primary producers in the food chain. H/WQMM-1: Develop storm water pollution prevent plans. H/WQMM-2 Water Quality Monitoring H/WQMM-3: Develop project specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and on-site and nearby structures into account. Ensure proper design, siting, and operational timing to reduce alterations of natural hydrology and adverse effects on stream and groundwater quality and quality from structural compliance measures. USSMM-3: Plan for and develop conservation and efficiency projects for water supply. Plan for and develop recycled water projects and aquifer storage and recovery (ASR) projects.	
Construction, installation, and operation of soil/groundwater remediation, wastewater treatment facilities, and variable outlet structures Upgrade or expansion of waste water treatment facilities Excavation	Noise	Temporary increases in noise from heavy equipment during compliance measures installation or upgrade. Temporary increase in noise from trucks and heavy equipment during excavations Temporary increase in noise from drill rigs installing monitoring wells, injection wells, or extraction wells. Use of pumps, mixers, and compressors to sample, remediate and treat water. Use of thermal treatment units/incineration can produce noise above ambient levels. Construction, modification or removal of facilities for the purpose of groundwater or surface water extraction, energy supply and/or recreation	NOMM-1: Noise Control Plans • Decibel monitoring • Peak noise working hours • Evening working hours • Equipment inspection • Muffler inspections • Nearby receptors • Compliant process plan • Operations contingency plan NOMM-2: Advanced notifications NOMM-3: Sound control structures NOMM-4: Equipment buffer	Less than Significant with Mitigation

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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Physical barriers Reservoir or stream aeration structures Aquatic Ecosystem Restoration Erosion and sediment control Measures to address tailwater and surface water impoundments Preservation of existing cold water resources Measures to Restore and Maintain Stream Flows		could result in short term and long term impacts from noise. Permanent increases in noise from wastewater treatment facility upgrades, or from decade-long cleanup projects.		
Preserve, maintain, and restore site specific potential effective shade Aquatic Ecosystem Restoration Measures to Restore and Maintain Stream Flows	Public Services	Retaining and preserving riparian areas can lead to increases in forest fires leading to an increase demand on fire services.	H/WQMM-1: Storm Water Pollution Prevent Plans H/WQMM-3: Develop site specific remedial action plans that take site characteristics including, geology, hydrology, environmental setting, and on-site and nearby structures into account. H/WQMM-5: Plant native vegetation that has evolved with the natural environment. Allow for the removal or thinning of upland vegetation that has high evapotranspiration rates and increases fire risks.	Less than Significant with Mitigation
Erosion and sediment control		Increased enforcement on sediment discharges from illegal cultivations could lead to an increased demand in local, state and federal law enforcement resources. Increase burden on vector control from wetland creation and sediment	Not applicable	Less than Significant

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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
		control basins.		
Construction, installation, and operation of soil/groundwater remediation facilities Upgrade or expansion of waste water treatment facilities Well installation Excavation Physical barriers Settling ponds Preserve, maintain, and restore site specific potential effective shade Aquatic Ecosystem Restoration Erosion and sediment control Measures to address tailwater and surface water impoundments Preservation of existing cold water resources	Transportation and Traffic	Temporary increase in truck traffic from the construction or expansion of a remediation or treatment system. Temporary increase in traffic from lane closures due to subsurface investigations. Temporary increase in traffic from excavation activities. Increased tree retention may conflict with transportation agencies (public roads) site distance requirements and areas designated as clear recovery zones. Short term traffic increases associated with sediment reduction project, construction projects, dam removal, stream and/or riparian restoration. A reduction in water resource availability could lead to agricultural land conversion, which in turn could lead to increased development and traffic.	TTMM-1: Traffic Control Plans • Signage locations • Through traffic routes • Designated truck routes • Construction site access • Designated work and staging areas • Parking areas • Pedestrian and bicycle safety access • Detours and lane closures • Emergency access routes and detours • Flaggers TTMM-2: Night Work TTMM-3: Strategic planning and design to avoid and minimize the placement of facilities that have site distance conflicts. Case-by-case evaluations of site distance. BRMM-4: Compensatory mitigation to create, replace, or restore filled or modified waters of the U.S. (streams and wetlands).	Less than Significant with Mitigation

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Compliance Measures	Environmental Factor	Potential Environmental Impact	Mitigation Measure	Level of Significance
Upgrade or expansion of waste water treatment facilities Construction, installation, and operation of soil/groundwater remediation facilities Measures to address tailwater and surface water impoundments Measures to Restore and Maintain Stream Flows	Utilities and Service Systems	Construction or demolition of facilities could result in short term interruption of utilities such as sewer, water, gas, electricity, phone, or internet. Dam removal, water conservation and/or reliance on alternative water sources could lead to short term interruptions and could lead to a decrease in available water supply and landfill capacity.	USSMM-1: Coordinate with the underground service alert system, and utility providers to develop project specific plans to avoid and minimize any potential utility interruptions. USSMM-2: Develop waste management plans for dam removal projects. Coordinate with prospective landfills regarding the estimated amount of waste generated by a proposed project and landfill capacity. USSMM-3: Plan for and develop conservation and efficiency projects for water supply. Plan for and develop recycled water projects and aquifer storage and recovery (ASR) projects.	Less than Significant with Mitigation