

4. IMPLEMENTATION

4.1 POINT SOURCE MEASURES

4.1.1 Waste Discharge Prohibitions

Section 13243 of the Porter-Cologne Water Quality Control Act authorizes the Regional Water Board - in a water quality control plan or in waste discharge requirements - to specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted.

Under this authority and in order to achieve water quality objectives, protect present and future beneficial water uses, protect public health, and prevent nuisance, the Regional Water Board declares that point source waste discharges, except as stipulated by the Thermal Plan, the Ocean Plan, and the action plans and policies contained in the Point Source Measures section of this Water Quality Control Plan, are prohibited in the following locations in the Region:

4.1.1.1 Klamath River Basin

1. All surface, freshwater impoundments and their tributaries, with the exception of the lower Lost River system.
2. Crescent City Harbor and all estuaries in accordance with the provisions of the State Water Board's "Water Quality Control Policy for the Enclosed Bays and Estuaries of California."
3. Smith River and its tributaries.
4. Klamath River and its tributaries, including but not limited to the Trinity, Salmon, Scott, and Shasta rivers and their tributaries.
5. The Applegate, Illinois, and Winchuck rivers and their tributaries.
6. On all coastal streams and natural drainage ways that flow directly to the ocean, all new discharges will be prohibited. Existing discharges to these waters will be eliminated at the earliest practicable date.
7. All intertidal reaches of the coast.
8. Areas of Special Biological Significance.
9. All other tidal waters unless it is demonstrated on the basis of waste characteristics, degree and reliability of treatment, rate of mixing and dilution, and other technical factors that water quality objectives will be met and all beneficial uses will be protected.

4.1.1.2 North Coastal Basin

1. All surface fresh water impoundments and their tributaries.
2. All bays and estuaries in accordance with the provisions of the State Water Resources Control Board's "Water Quality Control Policy for the Enclosed Bays and Estuaries of California".
3. The Mad and the Eel rivers and their tributaries during the period May 15 through September 30 and during all other periods when the waste discharge flow is greater than one percent of the receiving stream's flow as set forth in NPDES permits.¹

¹ For dischargers not in compliance with the seasonal prohibition and waste discharge rate limitation, time schedules shall be set forth in National Pollutant Discharge Elimination System (NPDES) permit updates for each discharger. In addition, each discharger not in compliance shall report to the Regional Water Board

4. The Russian River and its tributaries during the period of May 15 through September 30 and during all other periods when the waste discharge flow is greater than one percent of the receiving stream's flow as set forth in NPDES permits. In addition, the discharge of municipal waste during October 1 through May 14 shall be of advanced treated wastewater in accordance with effluent limitations contained in NPDES permits for each affected discharger, and shall meet a median coliform level of 2.2 mpc/100 ml.²
5. The Regional Water Board will consider exceptions for cause to the waste discharge rate limitations set forth in Prohibitions 3. and 4. (above). Exceptions shall be defined in NPDES permits for each discharger, on a case by case basis, and in accordance with the following:
 - a. The wastewater treatment facility shall be reliable.
 - b. Reliability shall be demonstrated through analysis of the features of the facility including, but not limited to, system redundancy, proper operation and maintenance, and backup storage capacity to prevent the threat of pollution or nuisance.
 - c. The discharge of waste shall be limited to rates and constituent levels which protect the beneficial uses of the receiving waters.
 - d. Protection shall be demonstrated through analysis of all the beneficial uses of the receiving waters. For receiving waters which support domestic water supply (MUN) and water contact recreation (REC1), analysis shall include expected normal and extreme weather conditions within the discharge period, including estimates of instantaneous and long-term minimum, average, and maximum discharge flows and percent dilution in receiving waters. The analysis shall evaluate and address cumulative effects of all discharges, including point and nonpoint source contributions, both in existence and reasonably foreseeable. For receiving waters which support domestic water supply (MUN), the Regional Water Board shall consider the California Department of Health Services evaluation of compliance with the Surface Water Filtration and Disinfection Regulations contained in Section 64650 through 64666, Chapter 17, Title 22 of the California Code of Regulations. Demonstration of protection of beneficial uses shall include consultation with the California Department of Fish and Game regarding compliance with the California Endangered Species Act.
 - e. The exception shall be limited to that increment of wastewater which remains after reasonable alternatives for reclamation have been addressed.
 - f. The exception shall comply with State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California," and the federal regulations covering antidegradation (40 CFR §131.12).
 - g. There shall be no discharge of waste during the period May 15 through September 30.
6. On all other coastal streams and natural drainageways that flow directly to the ocean all new discharges will be prohibited. Existing discharges to these waters will be eliminated at the earliest practicable date.
7. All intertidal reaches of the coast.
8. Areas of Special Biological Significance.
9. All other tidal waters unless it is demonstrated on the basis of waste characteristics, degree and reliability of treatment, location of discharge, rate of mixing and dilution, and other technical factors that water quality objectives will be met and all beneficial uses will be protected.

on progress towards compliance on an annual basis.

² For dischargers not in compliance with the waste discharge rate limitation and/or advanced wastewater treatment, time schedules shall be set forth in NPDES permit updates for each discharger. In addition, each discharger not in compliance shall report to the Regional Water Board on progress towards compliance on an annual basis.

4.1.2 Schedules of Compliance

The Regional Water Board may establish a Schedule of Compliance in a National Pollutant Discharge Elimination System (NPDES) permit under the following circumstances:^{3,4}

1. Where an existing discharger⁵ has demonstrated, to the Regional Water Board's satisfaction, that it is infeasible to achieve immediate compliance with effluent and/or receiving water limitations specified to implement new, revised, or newly interpreted water quality objectives, criteria, or prohibitions.⁶
2. Where a discharger is required to comply with Total Maximum Daily Loads (TMDLs) adopted as a single permitting action,⁷ and demonstrates that it is infeasible to achieve immediate compliance with effluent and/or receiving water limits that are specified to implement new, revised or newly interpreted objectives, criteria, or prohibitions.

The schedule of compliance shall include a time schedule for completing specific actions (including interim effluent limits) that demonstrate reasonable progress toward attaining the effluent and/or receiving water limitations, water quality objectives, criteria, or prohibitions. The schedule of compliance shall contain interim limits and a final compliance date based on the shortest feasible time required to achieve compliance (determined by the Regional Water Board at a public hearing after considering the factors identified below). Schedules of compliance in NPDES permits for existing NPDES permittees shall be as short as feasible, but in no case exceed the following:

- Up to five years from the date of permit issuance, re-issuance, or modification that establishes effluent and/or receiving water limitations specified to implement new, revised, or newly interpreted objectives, criteria, or prohibitions. A permittee can apply for up to a five-year extension, but only where the conditions of the schedule of compliance have been fully met, and sufficient progress toward achieving the objectives, criteria, or prohibitions has been documented.
- In no case shall a schedule of compliance for these dischargers exceed ten years from the effective date of the initial permit that established effluent and/or receiving water limitations specified to implement new, revised, or newly interpreted objectives, criteria, or prohibitions.

TMDL-derived effluent and/or receiving water limitations that are specified to implement new, revised, or newly interpreted water quality objectives, criteria, or prohibitions that are adopted as a single permitting action:

- In this scenario, schedules of compliance shall require compliance in the shortest feasible period of time, but may extend beyond ten years from the date of the permit issuance.

³ Schedules of compliance for CTR criteria are independently authorized and governed by 40 CFR 122.47 and 131.38, and the State "Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California" (CTR-SIP). This amendment is intended to supplement, not supersede, these provisions required by the CTR-SIP. All CTR limits must be consistent with the CTR-SIP and applicable federal rules.

⁴ Schedules of compliance for Non-NPDES Waste Discharge Requirements (WDRs) are also independently authorized by Porter Cologne, and will continue to be adopted on a case-by-case basis.

⁵ Existing discharger is defined in the State "Policy for Implementation of Toxic Substance Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California," (CTR-SIP) as any discharger (non-NPDES or NPDES) that is not a new discharger. An existing discharger includes an increasing discharger (i.e., an existing facility with treatment systems in place for its current discharge that is or will be expanding, upgrading, or modifying its existing permitted discharge after November 29, 2006). A new discharger includes any building, structure, facility, or installation from which there is, or may be, a discharge of pollutants, the construction of which commenced after November 29, 2006.

⁶ New, revised, or newly interpreted water quality objectives, criteria, or prohibitions means: 1) objectives as defined in Section 13050(h) of Porter-Cologne; 2) criteria as promulgated by the United States Environmental Protection Agency (USEPA); or 3) prohibitions as defined in the *Water Quality Control Plan for the North Coast Region* that are adopted, revised, or newly interpreted after November 29, 2006. Objectives and criteria may be narrative or numeric.

⁷ "Single permitting actions" means those where the Regional Board incorporates the requirements to implement a TMDL through one NPDES permit. These actions would not require a Basin Plan amendment, but would require a technical staff report to support the permit requirements and any permit specified compliance schedule. Furthermore, the USEPA would still be required to approve the TMDL under the federal CWA Section 303(d).

To document the need for and justify the duration of any such schedule of compliance, a discharger must submit the following information, at a minimum. The Regional Water Board will review the information submitted to determine if a schedule of compliance is appropriate.

For all applicants:

- A written request, and demonstration, with supporting data and analysis, that it is technically and/or economically infeasible⁸ to achieve immediate compliance with newly adopted, revised or newly interpreted water quality objectives, criteria or prohibitions.
- Results of diligent efforts to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream.
- Documentation of source control efforts currently underway or completed, including compliance with any pollution prevention programs that have been established.
- A proposed schedule for additional source control measures or waste treatment.
- The highest discharge quality that is technically and economically feasible to achieve until final compliance is attained.
- A demonstration that the proposed schedule of compliance is as short as technically and economically feasible.
- Data demonstrating current treatment facility performance to compare against existing permit effluent limits, as necessary to determine which is the more stringent interim limit to apply if a schedule of compliance is granted.
- Additional information and analyses, to be determined by the Regional Water Board on a case-by-case basis.

4.1.3 Action Plan for Humboldt Bay Area

The purposes of this Action Plan for the Humboldt Bay Area are to:

1. Acknowledge progress which has been made in the protection and enhancement of Humboldt Bay since the original (1975) Basin Plan and the 1980 and 1988 updates;
2. Describe the current status of programs in the watershed; and
3. Describe the surveillance, monitoring and assessment activities necessary to provide ongoing protection and enhancement of the water quality of the Humboldt Bay watershed.

I. Progress

The original (1975) action plan for the Humboldt Bay Area was intended to guide publicly-funded cleanup of the Bay. It envisioned full implementation of the State Water Board's 1974 "Water Quality Control Policy for Enclosed Bays and Estuaries" (SWRCB Resolution 74-43) and called for elimination of discharge of municipal wastewaters and industrial process waters (exclusive of cooling water discharges) to Humboldt Bay. That action plan allowed the Regional Water Board to permit continued discharges based on findings that the wastewater in question would be consistently treated and discharged in a manner that would enhance the quality of receiving waters or beneficial uses above that which would occur in the absence of the discharge. NPDES permits were granted to the City of Eureka, the City of Arcata, and College of the Redwoods, in accordance with the State Water Board's 1974 "Water Quality Control Policy for Enclosed Bays and Estuaries". Six publicly-owned treatment works (POTW) discharges and numerous overflow-prone pumping stations have been eliminated. Hundreds of failure-prone on-site sewage disposal systems have been eliminated through the sewerage of those areas.

Since the 1970s, numerous other measures to protect and enhance the water quality and beneficial uses of Humboldt Bay have been successfully implemented through application of Basin Plan action plans, policies and programs administered by the Regional Water Board and other state and local agencies.

⁸ Technical and economic feasibility shall be determined consistent with State Board Order 92-49.

While these accomplishments and assessments are important, water quality problems and concerns still exist in the Humboldt Bay area. As illustrated in the statewide Water Quality Assessment program, the Bay has been affected by point and nonpoint sources of water pollution and the potential for polluting episodes remains.

II. Bacterial Quality Concerns

The bacterial quality of Humboldt Bay is of particular concern due to the location of several of California's most important commercial oyster "farms" in the northern lobe of the estuary known as Arcata Bay. The shellfish harvest areas are classified by the California Department of Health Services according to several criteria, including their proximity to pollutant sources and the Department's knowledge that such areas are (or are not) of suitable sanitary quality. The Department is assisted in its classification process by close coordination with the Regional Water Board, sewage-management agencies, and the shellfish growers.

In Arcata Bay, shellfish harvest is permitted only in "Conditionally Approved" areas where water bacteriological quality meets the prescribed numerical standards described in Section 3 of this Plan, except during certain predictable periods. In this estuary, the exception occurs any time that a storm produces rainfall in excess of one-half inch within 24 hours. A harvest closure begins with each such storm and lasts for several days, depending on the storm pattern and intensity and the documented time required for "clearance" after the storm. This restriction recognizes that the bacterial quality of runoff into the Bay from all tributary watersheds causes the Bay waters to exceed the harvest-allowance standard.

In a federally-funded (Clean Water Act Section 208) study of the Bay in 1981-82, the Regional Water Board assessed the relative contributions of bacteria-laden runoff from different representative land-use areas including agricultural (pasture), rural residential, and urban areas. All were shown to produce significant bacterial concentrations in stormwater runoff. The major contribution was from pasture and rangelands. The assessment estimated that, should this land-use source be managed to preclude high-level bacterial discharges, there might be fewer days of shellfish harvest closure after each storm. The Department of Health Services, in its Humboldt Bay Management Plan, recognizes that such management has not been implemented.

III. Other Water Quality Concerns

Agricultural uses in the Humboldt Bay watershed include permanent pasture, confined animal facilities, commercial-scale flower and bulb farms, and grazing. These activities may result in erosion and runoff, producing discharges of sediment, nutrients, bacteria, and pesticides. Bacteria-laden runoff has been identified as the primary agriculturally-related discharge in the Humboldt Bay watershed. Continued Regional Water Board review and monitoring of agricultural activities is necessary.

Forestry activities in the watershed include timber harvesting, road construction, site preparation, and herbicide application. Timberland owners located in the upper watershed areas will continue to file timber harvest plans on lands zoned for timber harvest production. Road construction and reconstruction within streamside management zones and concentration of logging operations in a watershed will be given special scrutiny to avoid individual and cumulative impacts on the streams.

Urban runoff is affected by past and current land uses which range from thousands of individual households and small businesses to several wood-product factories, each with actual or potential discharges of pollutants via stormwater runoff. The recent stormwater NPDES regulations and possible small-municipality regulations must be implemented to advance the management of runoff-borne pollutants. In addition, the Regional Water Board has an active program to secure cleanup of contaminated soils, runoff and groundwater from such sites.

In addition, there are several sites around the bay where past spills and leaks have contaminated groundwater which discharges to the bay. The Regional Water Board, local agencies, and responsible parties must utilize appropriate cleanup and abatement practices to address these problems.

Regional Water Board and local agency programs to assist small business owners in preventing discharges of polluting chemicals must also be implemented.

Continued surveillance, monitoring, and assessment of water quality and land use activities around Humboldt Bay, and implementation of the Bays and Estuaries Policy are necessary to assure protection and enhancement of Humboldt Bay and its beneficial uses.

Accordingly, the Action Plan for Humboldt Bay includes the following elements:

1. Discharger surveillance and monitoring;
2. Review and assessment of land use activities; and
3. Continued coordination with other state and local agencies with various responsibilities with regards to Humboldt Bay.

4.1.4 Action Plan for The Santa Rosa Area Interim Action Plan (1986 – 1990)⁹ for The Santa Rosa Area

On or before July 1, 1990, the Regional Water Board will formally review this Interim action plan and may revoke authority to discharge under the provisions of the plan or may extend the interim compliance date providing the City of Santa Rosa demonstrates to the Regional Water Board reasonable progress on the City's stated goal to eliminate direct disposal of treated waste in the Russian River.

1. There shall be no discharge of waste to the Russian River from the Laguna Regional Sewage Treatment Facility during the period of May 15 through September 30 each year. There shall be no discharge from the Laguna Regional Sewage Treatment Facility for all other periods except as follows:
 - A. To the extent possible, only advanced treated wastewater as defined in effluent limitations contained in an NDPEs permit shall be discharged during October 1 to May 14. However, discharges of secondary treated wastewater as defined in effluent limitations contained in an NDPEs permit meeting a median total coliform level of 23 MPN/100 ml from the Laguna Regional Sewage Treatment and Disposal Facilities may be discharged during October 1 to May 14 at rates not exceeding one percent of the flow of the Russian River. In any year, there shall be no discharge of secondary treated wastewater to the Russian River when the flow of the River as measured at Guerneville (USGS Gage No. 11-4670.00) is less than 1,000 cfs. In instances when secondary treated wastewater is discharged, the discharger shall submit a report documenting the reasons for such discharges. In no case when secondary treated wastewater is discharged in combination with advanced treated wastewater shall the total discharge exceed one percent of the flow of the Russian River.
 - B. Discharge of advanced treated wastewater in accordance with an NDPEs permit from the Laguna Regional Treatment and Disposal Facilities to the Russian River may be permitted during October 1 through May 14 when all the following conditions are met:
 1. The discharger shall meet a total coliform level of 2.2 MPN/100 ml;
 2. In any year, discharge shall not commence until after the flow of the Russian River initially reaches 1,000 cfs as measured at Guerneville (USGS Gage No. 11-4670.00) or until authorized by the Regional Water Board or its Executive Officer. Such authorization shall be based on evidence that justifies the necessity for the discharge and that shows that all beneficial uses of the Russian River and tributaries will continue to be protected. The discharger shall document that system inflow has not exceeded the 1985 dry weather average plus incremental inflows not exceeding any irrigation and/or storage capacity added since 1985. Under wintertime (October 1 - May 14) drought conditions when the flow of the Russian River is less than 1,000 cfs, the

⁹ On September 21, 1989, the Regional Water Board adopted Resolution No. 89-111 which recognized the City of Santa Rosa's progress in complying with the Long-Range Plan for the Russian River and provides for continued application of the Interim Action Plan standards to the Santa Rosa area through July 1, 1995. Cease and Desist Order No. 92-147 adopted by the Regional Water Board on December 10, 1992 extends the Interim Action Plan standards through September 30, 1997 and Cease and Desist Order No. 93-103 adopted by the Regional Water Board on October 27, 1993 further extends the Interim Action Plan standards through September 30, 1999. This action plan will be amended at a future date.

Regional Water Board or its Executive Officer may suspend authorization to discharge waste, if necessary, to protect the beneficial uses of the Russian River or its tributaries.

3. Such discharge shall be limited to one percent of the flow of the Russian River except under the following conditions:
 - a. Discharges exceeding one percent of the flow of the Russian River shall be made in accordance with operating procedures to be incorporated into the NPDES permit for the Laguna Regional Wastewater Treatment Facilities. These operating procedures shall be designed to minimize the rate of discharge to the lowest percentage practicable, and to minimize the total volume of effluent discharged.
 - b. In such instances, the discharger shall provide a report to the Executive Officer documenting the reasons for increased waste discharges. The report shall include the dates, rates, and volumes of waste discharges and the circumstances necessitating such discharges and documentation that all beneficial uses of the Russian River and tributaries will be protected and that system inflow has not exceeded the 1985 dry weather average plus incremental inflow not exceeding any irrigation and/or storage capacity added since 1985.
4. In no case shall any discharge of advanced treated wastewater exceed five percent of the flow of the Russian River.

4.1.5 Interim Action Plan For The Trinity River

The purposes of this action plan are to describe those activities in the Trinity River watershed which implement the objectives listed below and to ensure a multi-agency collaborative approach to attainment of the objectives.

The Trinity River Division of the Central Valley Project, constructed in 1963 and operated by the United States Bureau of Reclamation, is a major water development project providing the transfer of water from the Trinity River to the Sacramento River Basin of California. Key features of the Trinity River Division are Lewiston Dam, Trinity Dam, and facilities which provide the diversion of runoff from the Trinity River watershed into the Sacramento River Basin. The construction of the dams and the diversion of approximately 80% of the natural flows of the Trinity River resulted in significant changes in the river.

The reduced flows resulted in changes to the river's temperature regime and disrupted physical cues for migration and spawning of salmon. To mitigate for the loss of fisheries habitat resulting from the project construction, the Trinity River Fish Hatchery was constructed at the base of Lewiston Dam. The fish populations have not been sustained, however, and both salmon and steelhead trout populations have declined since 1964, some stocks to as little as 10% of former levels. Efforts are currently underway to expand and improve the operations of the fish hatchery.

To the extent that factors are controllable as stated in Section 3 of this plan, the following temperature objectives shall apply to the activities in the Trinity River.

Daily Average Not to Exceed	Period	
60°F	July 1 - Sept. 14	Lewiston Dam to Douglas City Bridge
56°F	Sept. 15 - Oct. 1	Lewiston Dam to Douglas City Bridge
56°F	Oct. 1 - Dec. 31	Lewiston Dam to confluence of North Fork Trinity River

The Regional Water Board recognizes that the controllability of temperatures in the Trinity River downstream of Trinity and Lewiston Reservoirs is dependent on both climatic conditions and the operation of diversions to the Sacramento River.

The following ongoing efforts shall implement the temperature objective for the Trinity River:

The Trinity River Restoration Act (P.L. 98-541) authorized the Secretary of the Interior to formulate and implement a management program to restore fish and wildlife populations in the Trinity River Basin. To that end, the Bureau of Reclamation, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game formed the Trinity River Task Force in 1971 to study the fish and wildlife problems of the basin and to prepare a plan for identification and mitigation of the problems. Membership in the Trinity River Fishery Restoration Task Force now also includes the U.S. Bureau of Indian Affairs, the California Department of Water Resources, Trinity County, Humboldt County, the Hoopa Valley Tribe, the Yurok Tribe, the U.S. Forest Service, the Bureau of Land Management, the U.S. Soil Conservation Service, the National Marine Fisheries Service, the California Department of Forestry and Fire Protection, and the State Water Resources Control Board.

The Trinity River Task Force shall seek to achieve the temperature objectives listed above through its individual and collective authorities. In addition, the authorities shall strive to optimize Trinity River restoration efforts through the efficient and balanced use of cold water reserves from Trinity and Lewiston reservoirs.

In 1981, the U.S. Fish and Wildlife Service and the Water and Power Resources Service of the Central Valley Project entered into an agreement, signed by the Secretary of the Interior, to work cooperatively to halt further fishery declines and to begin an effective restoration program in the Trinity River. In recognizing the problem of balancing the needs to sustain the fishery resources in the Trinity River and the uses outside of the basin for water and power, the agreement established flow allocations for normal, dry, and critically dry years for a period of twelve years. At the end of the twelve-year evaluation period, the agreement calls for the U.S. Fish and Wildlife Service to submit a report to the Secretary of the Interior which summarizes the effectiveness of restoration of flows and recommends an appropriate course of action for future management of Trinity River flows. The twelve-year evaluation period began in 1985 and is scheduled for completion in 1996. The agreement also recognizes the need for the completion of a Fish and Wildlife Management Plan by the Trinity River Task Force, and its implementation to successfully restore the anadromous resources of the Trinity River Basin.

Because of the successive dry-weather conditions since 1985 and the subsequent release of reduced flows to the Trinity River, the Secretary of the Interior amended the 1981 agreement to provide increased flows to the Trinity River in 1991 and in successive years until the U.S. Fish and Wildlife Service completes its study of the Trinity River flows.

As information from the twelve-year study becomes available, the Regional Water Board shall review the effectiveness of this action plan in attaining the water temperature objectives.

In 1985 the Bureau of Reclamation entered into a cooperative agreement with the California Department of Fish and Game, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service to coordinate the operations of the Trinity River Division which impact the fishery resources. To that end, the agencies together attempt to establish the timing and the proportion of releases from Trinity Dam and Lewiston Dam which would most efficiently utilize the cold water reserves available for use by the anadromous fishery.

The above agencies shall collaborate to implement the objectives set forth in this plan, and shall apprise the Regional Water Board of the progress of this effort on an annual basis.

The State Water Board issued Orders WR 90-5 and 91-01 on May 5, 1990 and January 10, 1991, which set terms and conditions for fishery protection and set a schedule for completion of tasks for the thirty-two water rights permits, licenses, permitted applications and licensed applications for the Bureau of Reclamation's Central Valley Project. The orders included seven pending permitted applications for the diversion of cold water reserves from the Trinity River. The Orders recognized that protection of the upper Sacramento River fishery by means of water diversions from the Trinity River may adversely affect the Trinity River if not properly controlled, and chose to prevent and avoid any adverse effects to the Trinity River fishery as a result of the Order. The State Water Board will consider the comprehensive protection for the Trinity River fishery in a separate water rights proceeding in the near future. The State Water Board will consider the objectives set forth in this action plan in its future water rights proceedings for the Trinity River.

This action plan forms the basis for a collaborative approach to the management of fishery resources in the Trinity River and attainment of the water quality objectives.

The Regional Water Board will periodically review this action plan and information resulting from temperature and fishery studies in the drainage and other areas to determine the need for modification.

4.1.6 Interim Policy On The Regulation Of Waste Discharges From Underground Petroleum Tank Systems

At present, the Regional Water Board is using the following laws, policies, regulations and guidelines as the basis for investigations and cleanup of discharges from underground petroleum tank systems:

- The Porter-Cologne Water Quality Control Act
- The Water Quality Control Plan for the North Coast Region
- Chapters 15 and 16, Division 3, Title 23, California Code of Regulations
- State Water Resources Control Board Resolution No. 68-16
- The Health and Safety Code

It shall be the policy of the Regional Water Board to implement a program to investigate and cleanup groundwater pollution caused by unauthorized releases of petroleum from underground tanks that protects water quality while at the same time minimizes the cost to responsible parties and the public in general. The following principles shall constitute the Regional Water Board's interim policy:

1. With respect to all underground petroleum tank cases in this Region, the Regional Water Board's highest priority will be to eliminate pollutant sources through tank removal, free product removal, and removal of contaminated soil to the extent practicable. If required, the need for further remedial action will be based on impacts on the beneficial uses of affected waters as determined by reasonable monitoring or other investigation.
2. The Regional Water Board will then assign the highest priority to the resolution of underground petroleum tank cases where drinking water sources are being adversely impacted or are imminently threatened to be adversely impacted.
3. Where practicable, the Regional Water Board will schedule the investigation and cleanup of petroleum pollution by responsible parties to coincide with the availability of funds.
4. Where practicable, the Regional Water Board will recognize the use of alternative cleanup techniques such as in-situ bioremediation and passive remediation.
5. The Regional Water Board will assist the State Water Resources Control Board and claimants to the State Underground Storage Tank Cleanup Fund to further reduce investigative and cleanup costs while continuing to protect water quality:
 - a. through technology transfer;
 - b. through appropriate regulatory policy and legislative recommendations; and
 - c. through continuing coordination to implement regulatory policy and law.

4.1.7 Interim Action Plan For Cleanup Of Groundwaters Polluted With Petroleum Products And Halogenated Volatile Hydrocarbons

Discharges of waste from treatment facilities designed to remove pollutants from groundwaters polluted with petroleum products and halogenated volatile hydrocarbons shall be permitted to surface waters of the North Coast Region year-round with no discharge flow limitations based on the flow of the receiving water provided that the following conditions are met:

1. The discharge from the treatment facility shall be pollutant-free.¹⁰
2. The discharge shall not adversely affect the beneficial uses of the receiving water.
3. The discharge is necessary because a polluted groundwater cleanup operation is required by an action of the Regional Water Board.
4. The discharge is necessary because no feasible alternative to the discharge (reinjection, reclamation, evaporation, discharge to a community wastewater treatment and disposal system, etc.) is available.
5. The discharge is regulated by NPDES Permit/Waste Discharge Requirements.
6. The discharger has demonstrated consistent compliance with Provision 1, above.
7. The discharge is in the public interest.

4.1.8 Action Plan For Low Threat Discharges

The Regional Water Board finds that there are categories of discharges that pose a low threat to water quality when conducted and managed properly. A low threat discharge is generally a planned discharge that is short-term and/or of minimized volume from a definable project that results in a point source discharge to surface waters and that is managed in a manner that does not threaten the quality or beneficial uses of water without additional dilution. These discharges meet the definition of a waste,¹¹ and as such, are required to be permitted pursuant to the California Water Code. These low threat discharges can cause, or threaten to cause minor impairment of existing or potential beneficial uses of the receiving water if they are not properly managed through best management practices that remove pollutants and minimize the volume, rate, and duration of discharge.

The purpose of this Action Plan is to identify procedures for regulating low threat point source discharges that can be demonstrated to not have an adverse impact on beneficial uses or water quality and for which there are no other reasonable discharge alternatives, and thus provide exceptions to the Basin Plan Point Source Waste Discharge Prohibitions, set out on page 4-1.00.

Discharges resulting from the following sources could be determined to be low threat provided that the discharge does not contain pollutants in quantities that could adversely affect beneficial uses and the discharge meets specific criteria identified in this Action Plan:

- Construction dewatering.
- Installation, development, test pumping, maintenance and purging of water supply or geothermal wells.
- Hydrostatic testing, maintenance, repair, and disinfection of potable water supply vessels, pipelines, tanks, reservoirs, etc.
- Hydrostatic testing of newly constructed pipelines, tanks, reservoirs, etc., used for purposes other than potable water supply (e.g., gas, oil, reclaimed water, etc.);
- Dredge spoils dewatering;
- Other similar types of discharges that pose a low threat to water quality, yet technically must be regulated under a surface water discharge permit.

Low-threat point source discharges may be permitted to surface waters and may be exempted from the Basin Plan seasonal and year-round point source discharge prohibition and discharge flow limitation, provided that the following conditions are met:

¹⁰ For the purposes of this Interim Action Plan, pollutants are defined as those constituents and their breakdown products that were discharged to soils and/or groundwaters that necessitated a groundwater cleanup. Pollutant-free is defined as discharges that contain no detectable levels of pollutants as analyzed in currently approved EPA or State of California methodology. The Regional Water Board will define detectable levels in terms of numerical limits and shall specify such limits in individual NPDES permits or waste discharge requirements.

¹¹ California Water Code, Section 13050(d) defines a waste as including "sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of disposal."

1. The discharge shall not adversely affect the beneficial uses of the receiving water or cause a condition of nuisance.
2. The discharge shall comply with all applicable water quality objectives.
3. Best practicable treatment or control of the discharge shall be implemented to assure that pollution and nuisance will not occur, and the highest water quality consistent with maximum benefit to the people of the State will be maintained.
4. The discharge is necessary because no feasible alternative to the discharge (reclamation, evaporation, infiltration, discharge to a sanitary sewer system, etc.) is available.
5. The discharge is limited to that increment of wastewater that remains after implementation of all reasonable alternatives for reclamation or disposal
6. The discharge is regulated by NPDES Permit/Waste Discharge Requirements.

Low threat discharges that result in the discharge of pollutants to surface waters shall be covered under an NPDES permit/Waste Discharge Requirements. Several permit options are available, including, but not limited to Statewide general municipal, industrial, or construction storm water permits, Statewide General NPDES Permit for Discharges from Utility Vaults and Underground Structures, Regional Water Board general permits designed to address low threat discharges, and individual permits.

Discharges may be eligible for consideration for permit coverage as a low-threat discharge after the discharger submits specific information to the Regional Water Board for review and approval as required by and outlined in the appropriate permit or as otherwise required by the Regional Water Board.

4.1.9 Action Plan For Storm Water Discharges

Storm water runoff is part of the natural hydrologic cycle; however, human activities, particularly industrialization and urbanization, can result in significant and problematic changes to the natural hydrology of an area. As a result, when rain falls, pollutants may become dissolved in or eroded into, and carried by runoff, without treatment, into surface waters. These pollutants, unless controlled, may degrade the beneficial uses of surface waters. In addition to having direct effects on water quality, industrialization and urbanization of watersheds often alter natural runoff patterns. Storm water that would infiltrate into soils or get captured by vegetation and natural topography can get intercepted by impervious surfaces or compacted soils. Storm drain systems collect this runoff and discharge it directly into waterways. Increased runoff amounts and alteration of peak discharge rates can result in stream bank erosion, modification of natural habitat conditions and increased downstream flooding.

To address the recognized storm water problems, the U.S. Congress added Section 402(p) to the federal Clean Water Act in 1987. This section, and the federal regulations which implement it (40 CFR 122, 123, 124, November 1990), require NPDES permits for storm water discharges from municipalities and industries, including construction. The 1987 Clean Water Act amendments require municipalities to reduce pollutant discharges to the maximum extent practicable, and industries, including construction, to implement Best Available Technology and Best Conventional Pollutant Control Technology to reduce pollutants.

As a result of Section 402(p), the State of California developed a program for the implementation of four types of storm water permits:

- Phase I municipal storm water permits for municipalities serving greater than 100,000 people,
- Phase II municipal storm water permits for urbanized areas serving less than 100,000 people,
- Industrial storm water permits for facilities that discharge storm water associated with industrial activities requiring a general permit pursuant to 40 Code of Federal Regulations, Section 122.26(b)(14), and
- Construction storm water permits for sites that create land disturbance of one (1) acre or more.

Within the storm water permitting program, the State Water Resources Control Board (State Water Board) has issued statewide general permits for the regulation of storm water from Phase II municipalities, and industrial and construction activities. In addition, the State Water Board has issued a statewide storm water permit to the California Department of Transportation (CalTrans) in order to regulate municipal and construction storm water discharges from the state highway system and associated facilities. Enforcement of

all categories of storm water permits is the responsibility of the Regional Water Board. The Regional Water Board is also responsible for adopting Phase I municipal permits and may elect to adopt site-specific or region-wide municipal, industrial and construction site permits. In addition, provisions of the Clean Water Act allow the Regional Water Board to issue NPDES storm water permits to other construction, industrial or municipal sources based on a finding that these discharges are significant sources of pollutants to surface waters.

The statewide general Phase II municipal permit and the Phase I municipal permit for the Santa Rosa area require storm water dischargers to implement a Storm Water Management Program (SWMP) to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges, and to eliminate or minimize non-storm water discharges. The SWMP must include the following elements: public education and outreach; public involvement in development and implementation of the SWMP, inspections of commercial and industrial sites, inspections of storm water infrastructure and facilities, including construction sites, that may discharge storm water or non-storm water flows to the storm water infrastructure; monitoring of the storm water infrastructure (visual, water quality samples, other environmental indicators), including a program to detect and eliminate illicit discharges; pollution prevention and good housekeeping program for municipal operations; complaint response, and enforcement of violators. The Phase I and II municipal permits also require special programs aimed at construction sites, including the development and implementation of construction site storm water runoff control programs and post-construction storm water management programs. The post-construction storm water management program should include measures to implement low-impact design features on an individual site and area-wide basis. The goal of the program is to minimize the impact of new development on storm water quality and quantity. The statewide general industrial and construction storm water permits ("statewide general storm water permits") also require the implementation of best management practices (BMPs), including structural and non-structural controls to prevent and minimize pollutants in storm water and authorized non-storm water discharges.

The statewide general storm water permits, CalTrans permit and the Regional Water Board's Phase I permit all acknowledge that municipal and industrial storm water conveyance systems may receive certain de minimis categories of non-storm water discharges, including, but not limited to, flows from water line flushing, irrigation, air conditioning condensate, dechlorinated swimming pool discharges, and fire hydrant flow testing, that are not expected to be sources of pollutants as determined by studies conducted or approved by the State and regional water boards. The storm water permits do not prohibit certain types of low-threat non-storm water discharges from entering the storm drain system, provided that they are not significant contributors of pollutants to the municipal storm water conveyance system and do not result in violation of water quality standards. Although these discharges may individually pose little threat to water quality, the storm water permittee is required to implement certain control measures to ensure that these discharges, individually and cumulatively do not adversely impact water quality.

The allowable low-threat non-storm water discharges fall into two categories: (1) intentional discharges that are planned, routine and occur on an on-going basis and (2) incidental discharges that are unanticipated, accidental, and infrequent. Examples of intentional low-threat non-storm water discharge categories, include, but are not limited to discharges from foundation, footing and crawl space drains, residential swimming pool draining, air-conditioning condensate, and residential car washing. Examples of incidental low-threat non-storm water discharge categories include, but are not limited to, accidental discharges from potable water sources due to unexpected line breaks, incidental runoff of potable or recycled water from landscape irrigation due to an unexpected break in irrigation line or sprinkler head, and flows from emergency fire-fighting activities. The intentional discharges, by nature, are expected to have a lower risk of containing pollutants or causing other water quality problems such as erosion, because they are subject to planning to minimize pollutants and to control the rate, volume and timing of the discharge. Although the intentional discharge categories may cause nuisance, they require a lesser BMP program than the incidental discharges. Due to the unplanned nature of incidental discharges, this category of non-storm water discharges poses a slightly greater risk to water quality due to the potential for higher levels of pollutants and less opportunity to control the rate, volume, and timing of the discharge.

Discharges of storm water and certain categories of low-threat non-storm water flows (identified in paragraph 6 above and in individual and general storm water permits) from permitted storm water conveyance systems shall not be subject to the Basin Plan's point source waste discharge prohibitions provided that the following conditions are met:

1. The discharge and the activities which affect the discharge are managed in conformance with the provisions of the applicable NPDES permit.
2. The discharge does not cause adverse effects on the beneficial uses of the receiving water.
3. The permittee shall implement a general management program to eliminate or minimize non-storm water discharges into surface waters. The program shall be submitted to the Regional Water Board for approval and include implementation of BMPs, outreach and education, inspections, monitoring, reporting and enforcement provisions.

In addition, incidental discharges of low threat non-storm water flows from permitted storm water conveyance systems shall not be subject to the Basin Plan's point source waste discharge prohibitions provided that the following additional conditions are met:

1. The incidental discharge event is not due to negligent maintenance or poor design of infrastructure, or failure to oversee the activity that resulted in incidental runoff.
2. There were no feasible alternatives to the incidental discharge event, such as retention of the incidental runoff. This condition is not satisfied if measures for capturing the incidental discharge should have been installed to prevent incidental runoff, in the exercise of reasonable engineering judgment.
3. The permit holder and/or potable/recycled water user has a management plan, approved by the Regional Water Board Executive Officer, that identifies best management practices designed to avoid, minimize, and where appropriate mitigate incidental runoff incidents. The management plan must include education/outreach, inspection, monitoring, and enforcement components.

The Regional Water Board will continue to implement Section 402(p) of the Clean Water Act by permitting discharges of storm water from municipalities which own and operate storm water sewer systems, and discharges associated with industrial and construction activity (as defined in 40 CFR Part 122), to surface waters of the North Coast Region.

The following policy shall be implemented with respect to discharges from individual waste treatment and disposal systems.

4.1.10 On-Site Wastewater System Requirements

Requirements for siting, design, operation, maintenance, and management of on-site wastewater systems are specified in the State Water Resources Control Board's *Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems* (OWTS Policy). The OWTS Policy defines OWTS as individual disposal systems, community collection and disposal systems, and alternative collection and disposal systems that use subsurface disposal. OWTS do not include "graywater" systems pursuant to Health and Safety Code Section 17922.12. The OWTS Policy sets forth a tiered implementation program with requirements based upon levels (tiers) of potential threat to water quality. The OWTS Policy includes a conditional waiver of waste discharge requirements for on-site systems that comply with the policy.

The OWTS Policy, including future revisions, is incorporated by reference into this Basin Plan and shall be implemented according to the policy's provisions. A copy of the OWTS Policy can be found on the State Water Resources Control Board website.

4.1.10.1. Region-Specific Maintenance Responsibilities

Maintenance, monitoring, and repair of individual waste treatment and disposal systems shall be the responsibility of:

1. The individual property owner; or
2. A legally responsible entity of dischargers empowered to carry out such functions. That legally responsible entity shall be a public agency, unless demonstration is made to the Regional Water Board that an existing public agency is unavailable and formation of a new public agency is unreasonable. If such a

demonstration is made, a private entity must be established with adequate financial, legal, and institutional resources to assume responsibility for waste discharge.

4.1.11 Policy On The Control Of Water Quality With Respect To On-Site Waste Treatment And Disposal Practices Specific To The Russian River Watershed, Including The Laguna De Santa Rosa

In accordance with Section 4.2.1 of the OWTS Policy, OWTS systems within the Russian River Watershed shall continue to follow the existing Basin Plan requirements as detailed below, until the Regional Water Board adopts the Russian River pathogen indicator bacteria TMDL.

I. Objective

The North Coast Region is one of the fastest growing areas of California, with widespread and increasing dependence on on-site systems for sewage treatment and disposal. Due to ever-increasing costs, the ultimate construction of sewerage systems in developing areas can no longer be relied upon as a future solution to sewage disposal needs. More and more, on-site systems must be viewed as permanent means for waste treatment and disposal, capable of functioning properly for the life of the structure(s) served. The preponderance of adverse physical conditions throughout the North Coast Region necessitates careful evaluation of site suitability and design parameters for every on-site wastewater disposal system. This policy sets forth criteria and guidelines to protect water quality and to preclude health hazards and nuisance conditions arising from the subsurface discharge of waste from on-site waste treatment and disposal systems.

II. Findings

1. On-site waste treatment and disposal can be acceptable and successful. The success of the on-site system is dependent on suitable site location, adequate design, proper construction, and regular maintenance. Failure of the on-site system can result in water pollution and the creation of health hazards and nuisance conditions.
2. Waste from on-site systems must be disposed and disbursed below ground surface and away from high groundwater. There are existing parcels of land which, due to limitations in size, unsuitable soils, and/or high groundwater, cannot accommodate on-site waste disposal.
3. Division 7 of the California Water Code grants to the Regional Water Board jurisdiction over all discharges of waste, including those from individual waste treatment and disposal systems or from community collection and disposal systems which utilize subsurface disposal. Local regulatory agencies, however, can most effectively control individual waste treatment and disposal systems, provided they strictly enforce ordinances and regulations designed to provide protection of water quality and the public health. Regulation of on-site systems on federal lands is beyond the jurisdiction of local agencies and must remain with the Regional Water Board.
4. The many variations in physical conditions, population densities, and parcel sizes throughout the Russian River Watershed, including the Laguna de Santa Rosa (watershed) may affect the propriety of use of on-site water treatment and disposal systems. Adherence to the guidelines, criteria, and water conservation practices contained herein ordinarily will protect public health and water quality. Local regulatory agencies and the Regional Water Board are encouraged to adopt more stringent regulations when warranted by local conditions.
5. Factors may arise which will justify less stringent requirements than set forth in the guidelines and siting and design criteria contained herein. Provision for waiver is included in this policy to address such situations.
6. On-site waste treatment and disposal systems can be an excellent sanitation device in rural and rural-urban areas. However, in areas where population densities are generally high and the availability of land is limited, on-site systems are not desirable. On-site waste treatment and disposal systems should not be permitted if adequate community sewerage systems are available or feasible.

7. Water conservation practices may protect present and future beneficial uses and public health, and may prevent nuisance and prolong the effective life of on-site wastewater treatment and disposal systems. However, water conservation practices do not reduce the need to size on-site systems as set forth in this policy.
8. The life of on-site wastewater treatment and disposal systems may be severely limited if improperly maintained. A means must be available to assure adequate maintenance of individual waste treatment and disposal systems. Management by public entities is encouraged wherever practicable.
9. Soil characteristics play a dominant role in the suitability of a site for subsurface sewage disposal. Increased emphasis on determining and utilizing soils information will improve site suitability evaluations.
10. The installation of many on-site disposal systems within a given area may result in hydraulic interference between systems and adverse cumulative impacts on the quality of ground and surface waters. Physical solutions or limitations on waste load densities for land developments and other facilities may be necessary to avert such eventualities.
11. New technologies for on-site waste treatment and disposal continue to evolve. Means should be promoted to allow for timely and orderly consideration of promising alternative methods of waste treatment and disposal. Where alternative methods demonstrate enhanced performance, consideration may be given for utilization of different site criteria.
12. All aspects of on-site waste treatment and disposal would benefit from improved professional training and public education programs. Such training and education programs should be promoted by the Regional Water Board in cooperation with local regulatory agencies and public and private sector professional associations.

III. Site Evaluation Criteria and Methods

A. Criteria

The following site criteria are considered necessary for the protection of water quality and the prevention of health hazards and nuisance conditions arising from the on-site discharge of wastes from residential and small commercial establishments. They shall be treated as standards for assessing site suitability for such systems. Waiver of individual criterion may be made in accordance with the "Provision for Waiver" contained in this policy. Systems resulting in large wastewater loads may require additional criteria which are not covered in this policy, and which will require review by the Regional Water Board on a case by case basis.

1. Subsurface Disposal

On-site waste treatment and disposal systems shall be located, designed, constructed, and operated in a manner to ensure that effluent does not surface at any time, and that percolation of effluent will not adversely affect beneficial uses of waters of the State.

2. Ground Slope and Stability

Natural ground slope in all areas to be used for effluent disposal shall not be greater than 30 percent.

All soils to be utilized for effluent disposal shall be stable.

3. Soil Depth

Soil depth is measured vertically to the point where bedrock, hardpan, impermeable soils or saturated soils are encountered.

The minimum soil depth immediately below the leaching trench shall be three feet.

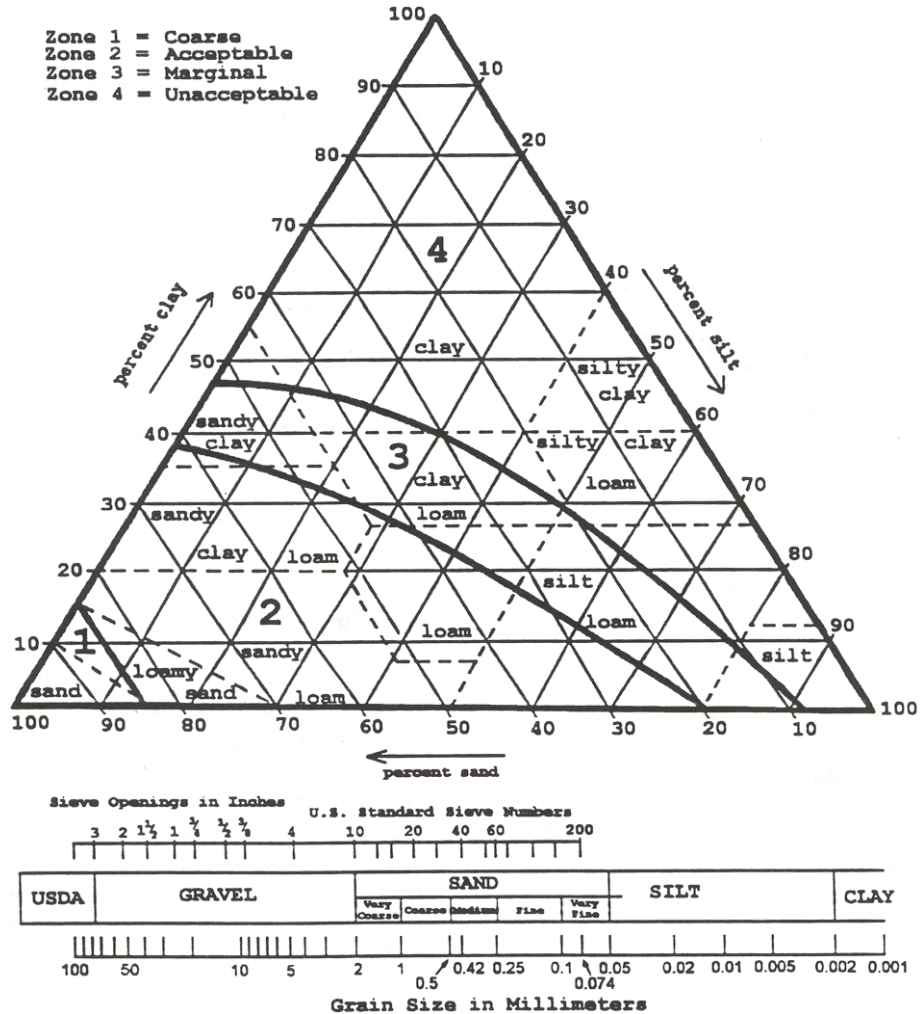
Lesser soil depths may be granted only as a waiver or for alternative systems.

**Table 4-1
Minimum Setback Distances (Feet)**

Facility	Well	Perennially Flowing Stream ¹	Ephemeral Stream ²	Ocean, Lake, or Reservoir ³	Cut Banks, Natural Bluffs, and Sharp Changes in Slope	Unstable Land Forms
Septic Tank/Sump	100	50	25	50	25	50
Leaching Field	100	100	50	100	25	50

1. As measured from the line which defines the limit of 10 year frequency flood.
2. As measured from the edge of the water course.
3. As measured from the high-water line.
4. Where soil depth or depth to groundwater below the leaching trench are less than five feet, a minimum set back distance of 50 feet shall be required.

FIGURE 4-2
SOIL PERCOLATION SUITABILITY CHART FOR ON-SITE WASTE TREATMENT SYSTEMS



Instructions:

1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the 100 percent sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the 100 percent clay direction an additional 15% for soils having a bulk-density greater than 1.7 gm/cc.

Note: For soils falling in sand, loamy sand, or sandy loam classification bulk density analysis will generally not affect suitability, and analysis is not necessary.

B. Methods of Site Evaluation

Site evaluations are required in all instances to allow proper system design and to determine compliance with the proceeding site suitability criteria prior to approving the use of on-site waste treatment and disposal systems. The responsible regulatory agency or Regional Water Board should be notified prior to the conduct of site evaluations since verification by agency personnel maybe required. Site evaluation shall be conducted by individuals qualified as described in Section X.6 of this policy, and evaluation methods shall be in accordance with the following guidelines.

1. General Site Features

Site features to be determined by inspection shall include:

- a. Land area available for primary disposal system and replacement area.
- b. Ground slope in the effluent disposal and replacement area.
- c. Location of cut banks, fills, or evidence of past grading activities, natural bluffs, sharp changes in slope, soil landscape formations, and unstable land forms within 50 feet of the disposal and replacement area.
- d. Location of wells, intercept drains, streams, and other bodies of water on the property in question and within 100 feet on adjacent properties.

2. Soil Profiles

Soil characteristics shall be evaluated by soil profile observations. One backhoe excavation in the primary disposal field and one in the replacement area shall be required for this purpose. A third profile shall be required if the initial two profiles show conditions which are dissimilar enough so as to alter the ultimate design or location of the leachfield area.

Augered test holes shall be an acceptable alternative, upon determination of the responsible regulatory agency: (a) where use of a backhoe is impractical because of access or because of the fragile nature of the soils, (b) when necessary only to very conditions expected on the basis of prior soils investigations, or (c) when done in connection with geologic investigations. Where this method is employed, three test holes in the primary disposal field and three in the replacement area shall be required.

In the evaluation of new subdivisions, enough soil profile excavations shall be made to identify a suitable disposal and replacement area on each proposed parcel.

The following factors shall be observed and reported from ground surface to a limiting condition or five feet below the proposed leachfield system:

- a. Thickness and coloring including Munsell Color Identification of soil layers, soil structure, and texture according to United States Department of Agriculture (USDA) classification.
- b. Depth to a limiting condition such as hardpan, rock strata, a large volume of rock fragments, or impermeable soil layer.
- c. Depth to observed groundwater.
- d. Depth to and description of soil mottling and gleying.
- e. Other prominent soil features which may affect site suitability, such as structure, stoniness, consistence, root zones and pores, dampness, massive and/or weak structured soils, etc.

3. Depth to Groundwater Determinations

The anticipated highest level of groundwater shall be estimated:

- a. As the highest extent of soil mottling observed in the examination of soil profiles; or

- b. By direct observation of groundwater levels during wet weather conditions. Methods for groundwater determinations and monitoring well construction shall be set forth by the local regulatory agency.

Where a conflict in the above methods of examination exists, the direct observation shall govern.

In those areas which, because of parent materials, soils lack the necessary iron compounds to exhibit mottling, direct observation during wet weather conditions shall be required. Guidance in defining such areas shall be provided by the Regional Water Board for each county within the watershed.

4. Soil Percolation Suitability

Determination of a site's suitability for percolation of effluent shall be either of the following methods:

a. Percolation Testing

Stabilized percolation rates shall be established utilizing methods specified by the local regulatory agency.

Percolation testing of soils falling within Zone 1 and Zone 2 may be conducted in non-wet weather conditions provided presoaking of the test hole is accomplished with (a) a continuous 12 hour presoaking, or (b) a minimum of four complete refillings beginning during the day prior to that of the conduct of the test.

Percolation testing of soils within Zone 3 and Zone 4 shall be conducted during wet weather conditions. However, percolation testing of soils within Zones 3 and 4 may be conducted in non-wet weather conditions provided the soils demonstrate a low shrink swell potential (Plasticity Index of less than 20, ASTM D 4318-84).

b. Soil Analysis

Soil samples representing the significant horizons within the excavated soil profile shall be obtained and analyzed for texture and bulk density according to methods prescribed by the Regional Water Board. The results shall be plotted on the soil textural triangle of Figure 4-2 as per indicated instructions.

- (1) Soils within Zone 1 shall be considered to have minimal filtration capabilities, requiring increased depths to groundwater as per Figure 4-1.
- (2) Soils within Zone 2 shall be considered suitable for effluent disposal without further testing.
- (3) Soils within Zone 3 and 4 shall require percolation testing as per (a) above to verify suitability for effluent disposal.

5. Wet Weather Criteria

Wet weather testing periods shall be determined geographically by local regulatory agencies incorporating the following criteria as a minimum:

- a. Between January 1 and April 30; and
- b. Following 10 inches of rain in a 30-day period or after one-half of the seasonal normal precipitation has fallen.

Modification of wet weather testing beyond the limits of the above criteria may be made in accordance with a program of groundwater level monitoring instituted and conducted by the local regulatory agency.

C. Provision for Waiver

Waiver of site suitability criteria and evaluation methods specified herein may be granted by the Regional Water Board or county Health Officer when it can be satisfactorily demonstrated that water quality will not be impaired and public health will not be threatened as a result of such waivers.

Waivers may be granted for:

- (1) Individual cases, or
- (2) Defined geographical areas.

The local regulatory agency shall notify the Regional Water Board of the basis for each waiver. Prior to granting geographical area waivers, the local regulatory agency shall submit technical justification to the Regional Water Board for review and concurrence.

D. Waiver Prohibitions

Where surveys conducted by the local regulatory agencies and/or Regional Water Board staff indicate that discharges from on-site waste treatment and disposal systems in specific geographical areas are resulting in or threatening to result in health hazards or water quality impairment, the Regional Water Board may prohibit the issuance of waivers in said areas.

Exemptions to such prohibitions shall be granted by the Regional Water Board only where an authorized public agency can provide satisfactory assurance that individual systems will be appropriately designed, located, sized, shaped, constructed, and maintained to provide adequate protection of beneficial uses of water and prevention of nuisance, pollution, and contamination.

E. Individual Systems Prohibitions

The discharge from existing or new individual systems utilizing subsurface disposal shall be prohibited by the Regional Water Board in accordance with Section 13280 of the California Water Code where substantial evidence shows that such discharges will result in violation of water quality objectives, will impair present or future beneficial uses of water, will cause pollution, nuisance, or contamination, or will unreasonably degrade the quality of any waters of the State. Identification of "individual systems prohibition areas" is incorporated into Section VIII of this policy.

IV. Design Criteria and Technical Guidelines

A. Estimates of Wastewater Flows for Design Purposes

Although actual wastewater flows may in fact be less, estimates of wastewater flows for the design of conventional on-site systems shall be based on 150 gallons per day per bedroom. Local regulatory agencies may incorporate reduced flows into the design of the on-site system upon approval by the Regional Water Board or for alternative systems. Estimated flow rates for on-site systems receiving wastewater flows of greater than 1,500 gallons per day or from commercial establishments shall take into account peak loading rates and the chemical characteristics of the wastewater.

B. Septic Tank Capacity, Construction, Inspection, and Testing

At a minimum, septic tank capacity, construction, inspection, and testing requirements shall be based upon the current edition of the International Association of Plumbing and Mechanical Officials Uniform Plumbing Code (1988 Edition), or other local agency regulations approved by the Regional Water Board.

Individual treatment units other than septic tanks shall require certification by the National Sanitation Foundation (NSF) or the International Association of Plumbing and Mechanical Officials (IAPMO) prior to approval for use.

C. Leachfield System Design

The design of the leachfield shall be based on both the estimated flows set forth in Section IV.A. of this policy, and the organic loading of the on-site system. Table 4-2, or other local regulatory agency regulations approved by the Regional Water Board shall be acceptable for conventional on-site systems.

Utilization of the upper horizons for wastewater disposal shall be encouraged. Sidewall depth below the bottom of the leaching pipe shall be a minimum of 12 inches and shall not exceed 36 inches. The use of trenches deeper than 36 inches below the bottom of the leaching pipe shall be acceptable only where site investigations and plans by a qualified individual (per Section X.6. of this policy) demonstrate the suitability of the system to accept wastewater and protect quality.

Trench width shall not exceed 36 inches. Plastic leaching chambers are acceptable, provided the size is based on Table 4-2 of this policy.

D. Cesspools

The use of cesspools for on-site waste treatment and disposal shall be prohibited.

E. Holding Tanks

The use of holding tanks shall be prohibited except where the responsible regulatory agency determines that:

1. It is necessary to abate an existing nuisance or health hazard; or
2. The proposed use is within a sewer service area, sewers are under construction or contracts have been awarded and completion is expected within two years, there is capacity at the wastewater treatment plant and the sewerage agency will assume responsibility for maintenance of the tanks; or
3. It is for use at a campground or similar temporary public facility where a permanent sewage disposal system is not necessary or feasible and maintenance is performed by a public agency.

F. Intercept Drains

The use of intercept drains to lower the level of perched groundwater in the immediate leachfield area shall be acceptable under the following conditions:

1. Natural ground slope is greater than 5 percent;
2. Site investigations show groundwater to be perched on bedrock, hardpan, or an impermeable soil layer;
3. The intercept drain extends from ground surface into bedrock, hardpan, or the impermeable soil layer.

In no case shall the pervious section of an intercept drain be located less than 15 feet upgradient or 50 feet laterally from any leachfield.

Where all of the above conditions cannot be met, actual performance of the intercept drain shall be demonstrated prior to approval.

Table 4-2 Rates of Wastewater Application for Absorption Areas

<u>Soil Texture</u>	<u>Percolation Rate Minutes per Inch</u>	<u>Application Rate Gallons per Day per Square Foot</u>
<u>Gravel, coarse sand</u>	<u><1</u>	<u>Not Suitable</u>
<u>Coarse to medium sand</u>	<u>1 – 5</u>	<u>1.2</u>
<u>Fine sand, loamy sand</u>	<u>6 – 15</u>	<u>1.1 – 0.8</u>
<u>Sandy loam, loam</u>	<u>16 – 30</u>	<u>0.7 – 0.6</u>
<u>Loam, porous silt loam</u>	<u>31 – 60</u>	<u>0.5 – 0.4</u>
<u>Silty clay loam, clay loam –a,b</u>	<u>61 – 120</u>	<u>0.4 – 0.2</u>

Note: Application rates may be interpolated based on percolation rates, within the ranges listed above.

- a. Soils without expandable clays.
- b. These soils may be easily damaged during construction.

G. Fills

The use of fills to create a leachfield cover shall be acceptable under the following conditions:

1. Where the natural soils and the fill material meet the evaluation criteria as described in Section III of this policy;
2. Where the quantity and method of fill application is described;
3. Where the natural slope does not exceed 20 percent;
4. Where placement of fill will not aggravate slope stability or significantly alter drainage patterns or natural water courses.

Leachlines for wastewater disposal shall be placed entirely within natural soils. Fill material shall not be used to create a basal area for alternative systems or mounds.

Local agencies shall provide specific criteria for the use of fill material which are compatible with the provisions of this policy.

H. Water Saving Devices

The use of water-saving devices may be incorporated into the on-site system design where maintenance of such devices is provided by a responsible entity.

Regional Water Board waste discharge regulation of on-site disposal systems may specify the use of water conservation.

I. Alternative Systems

An alternative system may be appropriate where physical site constraints preclude the installation of a standard septic tank leachfield on-site wastewater disposal system. Alternative systems shall be subject to a program of monitoring provided by a legally responsible entity.

1. Mound Systems

Mound systems utilize reduced criteria for soil permeability and depth to groundwater on slopes up to 12%. Percolation rates of up to 120 minutes per inch are allowed. A minimum of 24 inches of separation between groundwater and native ground surface is required. The mound design shall be based on the Design and Construction Manual for Wisconsin Mounds, Small Scale Wastewater Management Project, University of Wisconsin (January 1990).

2. Pressure Distribution Systems

Pressure distribution systems enable wastewater disposal in conditions of shallow topsoil over slowly permeable or fractured subsoils on slopes up to 30%. Percolation rates of 1 to 120 minutes per inch are required. The system shall have a minimum depth to groundwater, fractured or consolidated rock, or impermeable soils of 24 inches beneath trench bottom. The design shall comply with criteria set forth by the local regulatory agency.

3. At-Grade Systems

At-Grade Systems enable wastewater disposal in conditions of shallow topsoils on slopes up to 25%. Percolation rates of up to 120 minutes per inch are allowed. A minimum of 36 inches of separation between groundwater and native ground surface is required. The design shall be based on the Wisconsin At-Grade Soil Absorption System Siting, Design and Construction Manual, Small Scale Wastewater Management Project, University of Wisconsin (January 1990).

4. Sand Filters

Sand filters may be used to pretreat the effluent from a septic tank by application to a bed of specified media. Maintenance is required to assure the long-term effectiveness of sand filters.

Proposals for alternative systems other than those listed above shall be evaluated jointly by the local regulatory agency and the Regional Water Board staff on a case by case basis.

J. Cumulative Effects

The potential cumulative effects on ground and surface waters include, but are not limited to, groundwater mounding and nitrate loading. The local regulatory agency and the Regional Water Board shall determine the need for cumulative impact assessment for on-site systems, and will consider in particular, subdivision developments, commercial establishments, and on-site systems receiving greater than 1,500 gallons per day. For most on-site systems, the assessment of cumulative effects is not necessary.

Analysis of cumulative impact effects shall be conducted using accepted principles of groundwater hydraulics, shall describe the specific methodology, and shall include literature references as appropriate. The wastewater flow used for cumulative impact analysis shall normally be as follows: 100 gallons per day per bedroom for individual residential system; design sewage flow for multi-family and other non-residential systems.

a. Groundwater Mounding Analysis

Groundwater mounding analysis shall be used to predict the highest rise of the water table and shall account for background groundwater conditions during the wet weather season. The maximum acceptable rise of the water table for short periods of time during the wet weather season, as estimated from groundwater mounding analysis, shall be as follows:

For systems with design flows of less than 1,500 gallons per day, groundwater mounding beneath the disposal field shall not result in more than a 50 percent reduction in the minimum depth to seasonally high groundwater as specified in this policy.

For systems with design flows of 1,500 gallons per day or more, a minimum groundwater clearance of 24 inches shall be maintained beneath the system.

b. Nitrate Loading

Analysis of nitrate loading effects shall be based, at a minimum, on an estimate of an annual chemical-water mass balance.

Minimum values used for the total nitrogen concentration of septic tank effluent shall be: 40 mg/l as N (for average flow conditions) for residential wastewater, or as determined from sampling of comparable system(s) or from literature values.

On-site systems shall not cause the groundwater nitrate concentration to exceed 10.0 mg/l as N at any source of drinking water on the property nor on any off-site potential drinking water source.

K. Septage Disposal

Septage disposal shall comply, as a minimum, with the California Code of Regulations, Title 23, Division 3, Chapter 15 and with federal regulations as described in 40 CFR Part 503.

V. Maintenance Responsibilities

Maintenance, monitoring, and repair of individual waste treatment and disposal systems shall be the responsibility of:

1. The individual property owner; or
2. A legally responsible entity of dischargers empowered to carry out such functions. That legally responsible entity shall be a public agency, unless demonstration is made to the Regional Water Board that an existing public agency is unavailable and formation of a new public agency is unreasonable. If such a demonstration is made, a private entity must be established with adequate financial, legal, and institutional resources to assume responsibility for waste discharge.

For subdivision developments where waste discharge requirements are prescribed by the Regional Water Board, the existence or formation of a legally responsible entity of dischargers shall be required.

VI. Abatement

Abatement of failing individual waste treatment and disposal systems shall be obtained in accordance with local agency codes and procedures. When such remedies are ineffective and for systems subject to waste discharge requirements, abatement shall be obtained through Regional Water Board enforcement action.

Abatement of failing systems shall include short-term mitigation and permanent corrective measures. At a minimum, short-term mitigation shall include reduction of effluent flows and the posting of areas subject to the surfacing of inadequately treated sewage effluent.

VII. Waiver Prohibition Areas

There are no waiver prohibition areas identified in the Russian River Watershed, including the Laguna de Santa Rosa.

VIII. Individual System Prohibitions

In order to achieve water quality objectives, protect present and future beneficial water uses, protect public health and prevent nuisance, discharge of waste from new individual disposal systems may be prohibited forthwith and discharge of waste from existing individual disposal systems may be prohibited in defined areas.

The Regional Water Board may grant an exemption to the prohibition for:

1. New individual disposal systems after presentation of geologic and hydrologic evidence by the proposed discharger that such systems will not individually or collectively result in a pollution or a nuisance; and
2. Existing individual disposal systems if it finds that the continued operation of such systems in a particular area will not individually or collectively directly or indirectly affect water quality adversely.

IX. Education and Training

Informational bulletins concerning construction, use, maintenance, and repair of individual waste treatment and disposal system shall be made available for public education by local regulatory agencies.

Professional training concerning site evaluations and new alternative systems design concepts for subsurface effluent disposal shall be promoted periodically by Regional Water Board staff in cooperation with local regulatory agencies and public and private sector professional associations.

X. Implementation

1. Local agencies, shall, as necessary, revise existing sewage disposal ordinances to be compatible with the provisions of this policy. The Regional Water Board shall be notified by local agencies of the revisions.
2. Local agencies shall submit for Regional Water Board approval a report describing:
 - a. The current program and methods for disposing of septic tank pumpage; and
 - b. Plans for meeting future septage disposal needs.
3. Proposals for on-site waste treatment and disposal systems shall be processed as follows:
 - a. Processed entirely by the local regulatory agency:
 - i. Systems to serve a single dwelling unit within a recorded land development;
 - ii. Systems for less than 1,500 gpd domestic waste flows from commercial/industrial establishments;
 - iii. Land developments consisting of four or fewer parcels;
 - iv. Dwellings involving four or fewer family units.The Regional Water Board shall be notified of waivers granted for any of the above.
 - b. Reviewed by the Regional Water Board for possible establishment of waste discharge requirements:
 - i. Land developments consisting of five or more parcels;
 - ii. Dwellings involving five or more family units;
 - iii. Systems for commercial/industrial establishments with domestic waste flows equal to or greater than 1,500 gpd.
 - iv. All systems proposed for new construction or repairs on federal lands.
 - c. The Regional Water Board shall retain jurisdiction over any individual waste treatment and disposal systems which may in its judgment result in water pollution, nuisance and/or health hazards.
4. The Regional Water Board and local regulatory agency shall develop and maintain working agreements concerning procedures and guidelines to be followed in the issuance of waivers as provided by this policy.
5. The Regional Water Board shall, as necessary, request of each local regulatory agency in the watershed, an identification of geographical areas that may qualify for establishment of:
 - a. On-site wastewater management district,
 - b. Waiver prohibition areas, or
 - c. Individual system prohibitions.

Designation of such areas by the Regional Water Board shall be made formal by incorporation into this policy.

6. Site evaluations in accordance with this policy shall be performed by individuals who by virtue of their education, training, and experience, are qualified to examine and assess soil, geologic, and hydrologic properties as related to subsurface effluent disposal. Credentials required of such individuals shall be

specified by local regulatory agencies and shall include, as a minimum, education, training, and experience as geologist, soil scientist, registered civil engineer, or registered environmental health specialist.

7. Laboratory analysis of soils shall be conducted at commercial soils testing laboratories, or at other firms or establishments which can demonstrate to the satisfaction of the Regional Water Board the necessary equipment and personnel capabilities for performing the required tests. Procedures for laboratory analysis shall be provided by the Regional Water Board. Examination of soil testing capabilities shall be conducted by the Regional Water Board according to the demand.
8. Alternative systems shall be evaluated as follows:
 - a. The Regional Water Board shall, as necessary, prepare a written report which summarizes the progress and findings of the alternative systems within the watershed.
 - b. The local regulatory agency shall prepare a written report following the construction season which describes the number of alternative systems permitted and the operational status of the alternative systems within its jurisdiction.
 - c. The Regional Water Board shall prepare annually a report which summarizes the status of mound systems within the watershed.
 - d. The Regional Water Board shall maintain a literature and information file which pertains to alternative systems.
9. The Regional Water Board shall maintain a literature and information file which pertains to water conservation.
10. The local regulatory agencies shall establish, as necessary, a time schedule for compliance of seepage disposal sites to be compatible with the provisions of this policy.

XI. Definitions

The following definitions apply to this policy.

Alternative System. Any individual system that does not include a standard septic tank or an NSF or IAPMO certified device for treatment, or does not include standard leaching trenches for effluent disposal, which has been demonstrated to function in such a manner as to protect water quality and preclude health hazards and nuisance conditions.

Bedrock. Solid rock, which may have fractures, that lies beneath soils and other unconsolidated material. Bedrock may be exposed at the surface or have an overburden several hundred feet thick.

Bulk Density. The mass of dry soil per unit bulk volume. The bulk volume is determined before drying to a constant weight of 105°.

Coarse Fragments. Rock or mineral particles greater than 2.0 mm in diameter.

Conventional On-Site Waste Treatment and Disposal System. Any system using a standard septic tank for treatment and standard leaching trenches or seepage pit for effluent disposal.

Cumulative Effects. The persistent and/or increasing effect of individual waste treatment and disposal systems resulting from the density of such discharges in relation to the assimilative capacity of the ground environment. Examples include salt or nitrate additions to groundwater, nutrient enrichment of surface water, and hydraulic interference with groundwater and between adjacent systems.

Cut Bank. A man-made excavation of the natural terrain in excess of three feet.

Dual Leachfield System. An effluent disposal system consisting of two complete standard leachfields connected by an accessible diversion valve and intended for alternating use on an annual or semiannual basis.

Entity of Dischargers. A public agency, or a party which can demonstrate to the Regional Water Board comparable, legal and financial authority and responsibility, for the purpose of monitoring, inspecting, and maintaining individual waste treatment and disposal systems.

Ephemeral Stream. Any observable water course that flows only in direct response to precipitation. It receives no water from springs and no long-continued supply from melting snow or other surface source. Its stream channel is at all times above the local water table. Any water course that does not meet this definition is to be considered a perennial stream for the purposes of this policy.

Failure. The ineffective treatment and disposal of waste resulting in the surfacing of sewage effluent and/or the degradation of ground and surface water quality.

Greywater. Untreated household wastewater which has not come into contact with toilet waste. Greywater includes used water from bathtubs, showers, bathroom wash basins, and water from clothes washing machines, and laundry tubs. It does not include wastewater from kitchen sinks, dishwashers or laundry water from soiled diapers.

Groundwater. Any subsurface body of water which is beneficially used or is usable. It includes perched water if such water is used or usable, or is hydraulically continuous with used or usable water.

Hardpan. An irreversibly hardened soil layer caused by the cementation of soil particles. The cementing agent may be silica, calcium carbonate, iron, or organic matter.

Impermeable Soil Layer. Any layer of soil having a percolation rate slower than 120 MPI or a Zone 4 Soil Texture according to Figure 4-2 of this policy which has a high shrink swell potential (Plasticity Index of greater than 20, ASTM D 4318-84).

Incompatible Use. Any activity or land uses that would preclude or damage an area for future use as an effluent disposal site. Includes the construction of buildings, roads or other permanent structures and activities that may result in the permanent compaction or removal of existing soil.

Intercept Drain: A drain, installed to intercept the lateral movement of groundwater and discharge it to a suitable area. Often referred to as a certain drain.

Limiting Soil Layer. The portion of the soil profile that because of percolation characteristics, most restricts the successful operation of a leachfield.

Local Regulatory Agency. Any agency having authority as provided by county or city ordinances to control approval, installation, and use of individual waste treatment and disposal systems. May include county/city health department, building departments, or department of public works.

Mottles. Irregular spots of different colors that vary in number and size. The redoximorphic features of soils (mottling and gleying) are used to indicate poor aeration and lack of drainage.

On-Site Wastewater Disposal Zone. An area designated for operation and maintenance of individual waste treatment and disposal systems by a public agency entrusted with powers in accordance with the provisions of Chapter 3, Part 2, Division 6, of the State Health and Safety Code.

Perched Water. A subsurface body of water separated from the main groundwater body of a relatively impermeable stratum above the main groundwater body.

Perennial Stream. Any stretch of a stream that can be expected to flow continuously or seasonally. They are generally fed in part by springs.

Saturated Soil. The condition of soil when all available pore space is occupied by water and the soil is unable to accept additional moisture. In fine textured soils a free water surface may not be apparent. The extent of saturated soil conditions and anticipated level of high groundwater can be estimated by the extent of soil mottling.

Soil. The unconsolidated material on the surface of the earth that exhibits properties and characteristics that are a product of the combined factors of parent material, climate, living organisms, topography, and time.

Soil Depth. The combined thickness of adjacent soil layers that are suitable for effluent filtration. Soil depth is measured vertically to bedrock, hardpan, impermeable soil layer, or saturated soil.

Soil Horizon or Layer. A layer of soil approximately parallel to the land surface and differing from adjacent (underlying or overlying) layers in some property or characteristic. Differences include, but are not limited to, color, texture, pH, structure, and porosity.

Soil Texture (United States Department of Agriculture (USDA)). The relative amounts of sand, silt, and clay as defined by the classes of the soil textural triangle. Textural classes may be modified when coarse fragments are present in sufficient number, i.e., gravelly sandy loam, cobbled clay, etc.

Standard Leaching Trenches. Leaching trenches designed in accordance standard practice in local agency regulations.

Unstable Landform. An area which shows evidence of mass downslope movement such as debris flow, landslides, rockfills, and hummocky hillslopes with undrained depressions upslope. Unstable landforms may exhibit slip surfaces roughly parallel to the hillside; landslide scars and curving debris ridges; fences, trees, and telephone poles which appear tilted; or tree trunks which bend uniformly as they enter the ground. Active sand dunes are unstable land forms.

4.1.12 Policy On Disposal Of Solid Wastes

Solid waste is discarded to land throughout the North Coast Region. Solid waste can adversely affect water quality through (1) direct contact with receiving waters, (2) production of leachate which can subsequently commingle with receiving waters, and (3) the production of carbon dioxide which can subsequently dissolve in receiving waters. The resulting adverse effects on water quality may include: bacterial contamination, toxicity, tastes and odors, oxygen depletion, discoloration, turbidity, and increases in mineral and organic compound concentrations.

The Regional Water Board's solid waste program focuses on the protection of water quality by implementing the following regulations, laws, and policies:

- 1) California Code of Regulations, Title 23, Division 3, Chapter 15, Discharges of Waste to Land;
- 2) The mandated tasks of the solid waste assessment testing (SWAT) program carried out pursuant to Section 13273 of the Water Code;
- 3) The federal regulations for municipal landfills under the Resource Conservation and Recovery Act (RCRA), Subtitle D, (Title 40, Code of Federal Regulations, Part 258 (40CFR258));
- 4) The State Water Board's Policy for Water Quality Control for Regulation of Discharges of Municipal Solid Waste (Resolution No. 93-62).

The laws and regulations governing the discharges of solid wastes have been revised and strengthened in the last few years.

The Regional Water Board policy on disposal of solid waste is to require the orderly implementation of Chapter 15 requirements for all activities which constitute a discharge of waste to land and the application of federal Subtitle D regulations for municipal landfills.

Chapter 15 of the California Code of Regulations provides the overriding framework for solid waste regulation in California. These regulations provide criteria for classifying wastes according to their potential to affect water quality, and establish appropriate siting, design, and containment standards and corrective actions for each waste category. Chapter 15 also specifies monitoring requirements for discharges of waste to land and describes the documentation that a discharger must submit to allow the Regional Water Board to develop appropriate waste discharge requirements for the discharge. For example, waste discharge requirements for a typical municipal landfill contain provisions for the siting, design, construction, water quality monitoring, closure, types of waste to be discharged, and financial responsibility requirements.

On October 9, 1991, the U.S. Environmental Protection Agency promulgated regulations pursuant to Subtitle D of the Resource Conservation and Recovery Act that apply, in California, to dischargers who own and operate landfills which accept municipal solid waste on or after October 9, 1991. The majority of the federal regulations became effective on October 9, 1993. The U.S. EPA has identified several areas of Chapter 15 which are not adequate to ensure compliance with certain provisions of the federal regulations. To ensure adequate compliance, the State Water Board adopted the "Policy for Water Quality Control" (Resolution 93-62) on June 17, 1993. The Policy directs the Regional Water Boards to henceforth implement in waste discharge requirements for discharges at municipal solid waste landfills, both the Chapter 15 regulations and those applicable provisions of the federal regulations that are necessary to protect water quality. The Regional Water Boards shall revise existing waste discharge requirements to accomplish this by October 9, 1993.

The Regional Water Board continues to implement the SWAT program as resources become available. The primary goal of the SWAT program is to determine if disposal sites are discharging hazardous wastes into surface waters or groundwaters. The California Integrated Waste Management Board (CIWMB) is currently providing funding to the State and Regional Water Boards to work on Ranks 1 through 5. These were the sites which were perceived to pose the greatest threat to water quality. Work on high priority SWAT sites in the North Coast Region is expected to be completed in 1994.

Any additional work required at disposal sites in order to evaluate the threat or impact on beneficial uses of waters will be addressed through the implementation of Chapter 15 requirements.

In carrying out its mandate to protect water quality and regulate solid waste, the Regional Water Board has significant interaction with the CIWMB permitting, compliance, closure, and remediation programs. The CIWMB's the lead agency for nonhazardous waste management in California. The Regional Water Board also interacts with the local enforcement agencies, which enforce the requirements of the CIWMB and issue solid waste facility permits.

This policy describes the collaborative approach to the management of solid waste as required by federal and state regulations and policies. Implementation of this policy is necessary to protect beneficial uses of surface and ground waters in the North Coast Region.

4.1.13 Policy For Agricultural Wastewater Management

The regulation of wastewater resulting from confined animal facilities is described in the California Code of Regulations, Title 23, Division 3, Chapter 15.

In addition, the 1972 Amendments to Public Law 92-500 directed the U.S. Environmental Protection Agency to set up a permit system for all dischargers. The authority to administer the permit program was transferred to the State of California for waters within the State. Currently, federal regulations require permits only for point source surface water discharges from the following agricultural operations:

1. Feed lots with 1,000 or more slaughter steers and heifers.
2. Dairies with 700 head or more, including milkers, pregnant heifers, and dry mature cows, but not calves.
3. Swine facilities with 2,500 or more 55-pound swine.
4. Sheep feedlots with 10,000 head or more.
5. Turkey lots with 55,000 birds unless the facilities are covered and dry.

6. Laying hens and broilers, with continuous flow watering and 100,000 or more birds.
7. Laying hens and broilers with liquid manure handling systems and 30,000 or more birds.
8. Irrigation return flow from 3,000 or more acres of land when conveyed to navigable waters from one or more point sources.

However, the state may prescribe waste discharge requirements for any point source discharger regardless of size.

4.1.14 Action Plan For Regulation Of Mining Wastes

Several hundred existing and abandoned mines are located within the north coastal area. Many of the mines in the Klamath River Basin are being reworked for gold as a result of rising world gold prices. Improper operation and in some cases poor location have resulted in turbidity and sediment discharges which adversely affect beneficial uses.

A number of mining operations, principally sand and gravel extraction, occur in the watersheds of the North Coastal Basin. In addition to sand and gravel, numerous other commodities such as manganese, copper, mercury, and crushed rock have been mined. The major potential problems relating to these operations are increased turbidity resulting from wash-off or discharge of tailings, and the toxic threat of heavy metals to aquatic organisms.

The regulation of mining waste is described in the California Code of Regulations, Title 23, Division 3, Chapter 15. To implement the Code and to protect the quality of waters from adverse effects resulting from mining waste discharges, the Regional Water Board shall (1) adopt waste discharge requirements on operations which could potentially adversely affect water quality in the Region, (2) immediately issue cleanup and abatement orders to mining operations which are potentially or actually adversely affecting water quality, (3) immediately begin documentation of waste discharges for purposes of taking enforcement actions if necessary, (4) issue enforcement orders when appropriate, and (5) seek civil penalties and/or refer violations of cleanup and abatement orders and cease and desist orders to the Attorney General.

4.1.15 Action Plan For Accidental Spills And Contingencies

On July 24, 1974, the Regional Water Board adopted Resolution No. 74-151 entitled "Contingency Planning and Notification Requirements for Accidental Spills and Discharges". The Order was formulated and adopted by the Regional Water Board when it became apparent that specific waste dischargers were unprepared for emergency situations.

The Order requires entities which discharge, convey, supply, store, or otherwise manage wastes to (1) formulate and submit a contingency plan to the Regional Water Board, (2) immediately report to the Board by telephone any accidental discharge, (3) begin immediate cleanup and abatement activities, and (4) confirm the telephone notification in writing within two weeks of the incident. The written notification is to include the reason for the discharge, the duration and the volume of the discharge, steps taken to correct the problem, and steps taken to prevent the problem from recurring. In the event of a spill or discharge emergency, the Regional Water Board acts as a liaison with the discharger and other affected agencies and persons to provide assistance in clean-up and abatement activities.

Section 25180.7 of the Health and Safety Code requires designated employees of the Regional Water Board to inform local agencies of any illegal discharge or threatened illegal discharge of a hazardous waste.

Section 13271 (a) of the Porter-Cologne Water Quality Control Act requires immediate notification of illegal and accidental discharges of sewage or hazardous substances to the Office of Emergency Services and the Regional Water Board, and further requires that the Regional Water Board: 1) list all such notifications at its next business meeting, and 2) notify appropriate local health officials.

4.1.16 Policy On The Regulation Of Fish Hatcheries, Fish Rearing Facilities, And Aquaculture Operations

Fish hatcheries, fish rearing facilities, and aquaculture operations, if regulated, may enhance beneficial water uses. These operations characteristically require the utilization of large quantities of water on a continuous basis. Most of the water is used to satisfy the flow-through requirements of the fish, and is returned to the receiving waters without alteration of beneficial uses. Wastes generated during the care and feeding of fish may include suspended and settleable solids, salt (sodium chloride), antibiotics, anesthetics, and disease control agents. The following criteria shall apply to the discharge from fish hatcheries, rearing facilities, and aquaculture operations:

1. The discharge shall not adversely impact the recognized existing and potential beneficial uses of the receiving waters.
2. The discharge of waste resulting from cleaning activities shall be prohibited.
3. The discharge of detectable levels of chemicals used for the treatment and control of disease, other than salt (NaCl) shall be prohibited.
4. The discharge will be subject to review by the Regional Water Board for possible issuance of Waste Discharge Requirements/NPDES permit.
5. The Regional Water Board may waive Waste Discharge Requirements for fish hatcheries, fish rearing, and aquaculture facilities, provided that the discharge complies with applicable sections of the Water Quality Control Plan for the North Coast Region and satisfies the conditions for waiver which are described in Regional Water Board Resolution No. 87-113 (Appendix Section of this Plan).
6. The public interest is served by the fish hatchery, rearing facility, or aquaculture operation.

4.1.17 Policy On Powerplant Cooling

Utilization of fresh waters of the basin for powerplant cooling poses both quantity and quality problems. Approximately 25,000 acre-feet of water per year are required for cooling purposes for each 1,000 megawatts of installed generating capacity if evaporative cooling towers are used. Losses of cooling water through evaporation would be approximately 22,000 acre-feet per each 1,000 megawatts of generating capacity. Such losses for powerplant cooling could seriously affect the availability of water for other consumptive uses, and may impair the beneficial use of the water for such nonconsumptive uses as esthetic, fish and wildlife habitat, and recreation purposes.

The utilization of fresh inland waters of the Region for powerplant cooling is regulated by the State Water Resources Control Board's Thermal Plan, (Appendix Section of this Plan). In addition, the Regional Water Board can adopt waste discharge requirements on powerplant cooling operations which could potentially adversely affect water quality in the Region.

4.1.18 Policy On Residual Wastes

Residual wastes such as raw sludge from sewage treatment plants shall be disposed of only at sites approved by the Regional Water Board. In approving such sites the Board shall be guided by the regulations contained in the California Code of Regulations, Title 23, Division 3, Chapter 15.

4.2 NONPOINT SOURCE MEASURES

California has achieved considerable improvements in controlling point source discharges, such as wastewater from municipalities and industrial facilities. It is now recognized that in many areas nonpoint source discharges, such as stormwater runoff, are the principal sources of contaminant discharges to surface water and groundwater.

In contrast to point sources, which discharge wastewater of predictable quantity and quality at a discrete point (usually at the end of a pipe), nonpoint source discharges are diffuse in origin and variable in quality. Management of nonpoint source discharges is in many ways more difficult to achieve, since it requires an

array of control techniques customized to local watershed conditions.

Section 319 of the 1987 amendments to the federal Clean Water Act establishes the framework for nonpoint source activities. Section 319 requires each state to develop nonpoint source management plans and to conduct an assessment of the impact nonpoint sources have on the State's waterbodies. In response to these requirements, the State Water Board adopted the Nonpoint Source Management Plan in 1988 and the Water Quality Assessment in 1990.

This section presents the actions intended to meet water quality objectives and protect beneficial uses with regards to nonpoint source discharges. The following measures shall be taken with respect to actual and potential nonpoint sources of water quality degradation. The action plans contained in this section are consistent with the State Water Board's Nonpoint Source Management Plan (see Section 5). The action plans emphasize cooperation with local governments and other agencies to promote the voluntary implementation of best management practices and remedial projects in a three-tiered approach: 1) voluntary implementation, 2) regulatory-based encouragement, and 3) effluent limitations.

4.2.1 Action Plan For Logging, Construction, And Associated Activities

The following waste discharge prohibitions pertain to logging, construction, and associated activities in the North Coast Region.

1. The discharge of soil, silt, bark, slash, sawdust, or other organic and earthen material from any logging, construction, or associated activity of whatever nature into any stream or watercourse in the basin in quantities deleterious to fish, wildlife, or other beneficial uses is prohibited.
2. The placing or disposal of soil, silt, bark, slash, sawdust, or other organic and earthen material from any logging, construction, or associated activity of whatever nature at locations where such material could pass into any stream or watercourse in the basin in quantities which could be deleterious to fish, wildlife, or other beneficial uses is prohibited.

Similarly, the guidelines for implementation of the prohibitions have proven most helpful to the Regional Water Board and its staff as well as to potential waste dischargers.¹² They reflect state regulations, objectives, and procedures, and are as follows:

4.2.2 Guidelines For Implementation And Enforcement Of Discharge Prohibitions Relating To Logging, Construction, Or Associated Activities

These guidelines, which are hereby incorporated into the Water Quality Control Plan for the North Coast Region (Basin Plan), have been developed with the objective of (1) defining the criteria by which the Regional Water Board will consider that violations of the prohibitions have occurred or threaten to occur; (2) instructing the Regional Water Board staff of procedures and actions they will take in implementing the prohibitions; (3) advising all potential dischargers of the scope and intent of the prohibitions; and (4) advising all interested parties that it is the intent of this Regional Water Board to carry out its responsibilities in this matter in a reasonable and effective manner.

Criteria

- A. Section 3 of the Basin Plan contains water quality objectives, which specify limitations on certain water quality parameters that are not to be exceeded as a result of waste discharges. Accordingly, the Executive Officer of the Regional Water Board is directed to investigate and report to the Regional Water Board evidence of violations of the water quality objectives contained in the Basin Plan which result or threaten to result in unreasonable effects on the beneficial uses of the waters of the Region. When such investigation reveals that such violations are occurring or are threatened due to the discharge or threatened discharge of waste, the Executive Officer shall take all appropriate actions as directed by the

¹² Since 1984 these guidelines have been applied to watershed disruptions which might be caused by small hydropower development projects, and the prohibitions are recognized by project sponsors as the water quality protection standard for these activities.

Enforcement section of these guidelines.

The following water quality objectives, from Section 3 of the Basin Plan, are considered of particular importance in protecting beneficial uses from unreasonable effect due to discharges from logging, construction, or associated activities:

1. Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses.
2. Turbidity shall not be increased more than 20 percent above naturally occurring background levels.
3. Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance or adversely affect the beneficial uses.
4. Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
5. Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses.
6. The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
7. All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.
8. Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.

B. Definitions

1. Definitions for the following terms in these guidelines are provided in Section 13050 of the Porter-Cologne Act:
 - a. "**Waste**" includes sewage and any and all other substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation of whatever nature, including such waste placed within containers of whatever nature prior to, and for purposes of, disposal.
 - b. "**Beneficial uses**" of the waters of the State that may be protected against quality degradation include, but are not necessarily limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation, aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources of preserves.
 - c. "**Water quality objectives**" means the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.
 - d. "**Water quality control**" means the regulation of any activity or factor which may affect the quality of the waters of the State and includes the prevention and correction of water pollution and nuisance.
 - e. "**Water quality control plan**" consists of a designation or establishment for the waters within a specified area of (1) beneficial uses to be protected, (2) water quality objectives, and (3) a program of implementation needed for achieving water quality objectives.
 - f. "**Pollution**" means an alteration of the quality of the waters of the State by waste to a degree which unreasonably affects: (1) such waters for beneficial uses, or (2) facilities which serve such beneficial uses. "Pollution" may include "contamination".
2. The definition for "stream or watercourse" as those terms are used in the waste discharge prohibitions relative to logging and construction activities shall be interpreted by the Regional Water Board to mean the following: Natural watercourse as designated by a solid line or dash and three dots symbol shown in blue on the largest scale United States Geological Survey Topographic Map most recently published.

- C. The Regional Water Board acknowledges that it does not have jurisdiction for direct enforcement of the rules and regulations of other local, state, or federal agencies. However, the Regional Water Board directs the Executive Officer to investigate the violation or threatened violation of those rules and regulations of other agencies which have been adopted to protect the quality of the waters in the Region. The violation of the following rules, regulations, or provisions may be considered a threatened violation of the waste discharge prohibitions and accordingly the Executive Officer shall take appropriate action as directed by the Enforcement section of these guidelines.
1. A violation of current rules for forest practices relating to erosion control or water quality protection in any logging or related activity being conducted pursuant to regulations administered by the California Department of Forestry and Fire Protection.
 2. A violation of the Best Management Practices designated in the U.S. Forest Service document entitled "Water Quality Management for National Forest System Lands in California", dated April, 1979.
 3. A violation of the water pollution control provisions of the current California Standard Specifications in any highway project being constructed under contract entered into by the Department of Transportation, State Department of Public Works.
 4. A violation of Sections 1601, 1602, 1603, 5650, and 5948 of the California Fish and Game Code when such violation involves activities or discharges enumerated in the aforesaid prohibition.

Investigative and Coordinating Activities

- A. The Regional Water Board directs the Executive Officer to implement the following investigative activities. It is intended that, wherever possible, existing state reporting procedures and requirements will be utilized to minimize additional administrative burden on prospective waste dischargers.
1. The staff of the Regional Water Board is directed to investigate and review, on a continuing basis, logging operations, road building, and related construction activities within the Region to determine the effect, or potential effect, of such activities on water quality.
 2. The staff shall consult with any individual associated with logging operations, road building or construction activities having an effect on the quality of waters in the Region, and shall investigate such activities when requested to do so.
 3. The staff shall obtain from the California Department of Forestry and Fire Protection, the Board of Forestry, and the Department of Fish and Game copies of all notices received from timber operations, timber harvesting plans, and stream alteration activities within the Region.
 4. The staff shall obtain from the Department of Transportation the names of all contractors performing work that could result in violation of the discharge prohibitions. The Forest Service, USDA and other federal agencies will be requested to furnish the Regional Water Board, as early as feasible, with the names, addresses, and location of anticipated operations of all private contractors who will be engaged in logging, construction or related activities on lands in the region which are under their control. In connection with these contracts, request will be made for copies of any special conditions or regulations for the control of erosion or protection of water quality.
 5. Upon receipt and review of such information, the staff will transmit to the permittee or contractor copies of the discharge prohibitions and provisions as contained in the Regional Basin Plans and copies of this or subsequent implementation statements on this subject issued by the Regional Water Board.
 6. The staff will request that the California Department of Forestry and Fire Protection notify the Regional Water Board's office of citations or of other notices issued by Forestry personnel for violation of erosion control sections of the Forest Practice Rules. The staff will request that the Department of Fish and Game advise the Regional Water Board's office of all violations of its code Sections 5650, 1601, 1602, and 5948 resulting from logging, road building, or associated construction activities. The staff will request that the Department of Transportation notify the Regional Water Board office of all

violations of the water pollution control provisions of the California Standard Specifications and will request that the Forest Service, USDA, and other federal agencies, notify the Regional Water Board's office of all violations of rules and regulations for the control of erosion or protection of water quality.

7. The staff will notify the State Department of Fish and Game, the California Department of Forestry and Fire Protection, the State Department of Transportation, the Forest Service, USDA, and the violating timber operator and/or land owner, of all violations of the discharge prohibitions and of all actions taken by the Regional Water Board with regard to such violations or threatened violations.
 8. The staff may request additional information from any individual or firm engaged in timber operations, road building, or related construction activity in accordance with Water Code Section 13267(b) as may be necessary to implement their investigations and carry out the policy of this Regional Water Board.
- B. The Regional Water Board considers that implementation of the discharge prohibitions relating to logging, construction, or associated activities can provide appropriate protection to waters of the region from these sources of waste and, in the great majority of their activities, will waive the need for reports of waste discharge and waste discharge requirements. However, where investigations indicate that the beneficial uses of water may be adversely affected by waste discharges, the staff shall require the submission of Reports of Waste Discharge.

Enforcement Activities

When investigation by the staff reveals that violations as described in the Criteria section of these guidelines are occurring or are threatened due to the discharge or threatened discharge of waste, the actions to be taken by the Executive Officer are as follows:

A. Cleanup and Abatement Order

1. If the discharge of waste can be cleaned up or its adverse effects abated, a cleanup or abatement order shall be issued to the discharger or other responsible persons.
2. The order and all relevant information shall be transmitted to the discharger as provided in the Manual of Administrative Procedures. Copies of these materials shall be transmitted concurrently to all Regional Water Board members and all other interested agencies.
3. The Regional Water Board may hold a public hearing for purposes of making the necessary findings under Water Code Section 13350(a)(2) with respect to a cleanup or abatement order or violation of waste discharge prohibition at any regular meeting of the Regional Water Board, or at a special meeting of the Regional Water Board called by the Chairman, on his own motion or at the request of the Executive Officer, or when called by two Regional Water Board members as provided in Water Code Section 13204.

B. Cease and Desist Order

If a cleanup or abatement order would not be the most expeditious means of achieving compliance with the prohibitions, the Executive Officer shall notify the Regional Water Board Chairman of his intention to bring the matter before the Regional Water Board, at either a regular or a special meeting, for consideration of evidence and recommendation that a cease and desist order be issued. The decision by the Executive Officer to recommend a cease and desist order hearing shall be made after consideration of the following factors:

1. The nature of the activity of the discharger.
2. The anticipated length of time the discharger will be carrying on the activity which results or threatens to result in a waste discharge.
3. The potential deleterious and unreasonable effect on beneficial uses of the waters during the time

before the Regional Water Board will be able to take action on the violation of the prohibitions.

4. Other relevant factors considered applicable by the Executive Officer as necessary to bring before the Regional Water Board for their consideration and deliberation.

4.2.3 Policy For The Control Of Discharges Of Herbicide Wastes From Silvicultural Applications

It is the policy of this Regional Water Board to assure that the use and possible discharge of herbicide wastes be controlled to provide all necessary protection of the beneficial uses of water. Accordingly, the Regional Water Board establishes a program to control the discharge of herbicides to waters of the State within the North Coast Region to protect water quality. It is the policy of this Regional Water Board to determine safe limits for the discharge of pollutants, including herbicides. All limits will be incorporated into the Action Plan as they are determined and self-monitoring programs will be developed and prescribed to assure compliance with all appropriate limits.

4.2.4 Action Plan For Control Of Discharges Of Herbicide Wastes From Silvicultural Applications

The Regional Water Board acknowledges that it is not the lead agency in regulating pesticide use in the North Coast; the lead agency is the Department of Food and Agriculture (DFA). However, the Regional Water Board recognizes its obligation in regulating all wastes discharged to water and in protecting water quality. It is not the Regional Water Board's intent to prescribe waste discharge requirements for pesticide applications when the rules, regulations, and guidelines of other agencies adequately protect beneficial water uses. It is not the intent of the Regional Water Board to require the discharger to furnish information that has already been furnished to other agencies. Accordingly, the Executive Officer shall obtain the needed information from other governmental agencies to the maximum extent possible. Therefore, the Regional Water Board directs the Executive Officer to obtain information on proposed aerial herbicide application projects which will provide assurance that the proposed silvicultural herbicide use will protect water quality. Such information includes, but is not limited to, the following:

- a. Topographic map or other map scaled at not less than four inches equals one mile or other scale acceptable to the Executive Officer which clearly delineates the treatment areas and all nearby water courses, wells, ponds, irrigation ditches, or wet areas.
- b. Description of the application method and means employed to avoid discharge to water.
- c. A water monitoring plan responsive to the need for an "early warning" capability.
- d. A spill contingency and control plan indicating downstream water users and the mechanism to provide "early warning" in the event of substantial water contamination.
- e. This information should be received by the Regional Water Board 45 days in advance of the operation.

The Executive Officer shall consult with the discharger and the lead agencies to mitigate threatened discharges which would violate any section of this Action Plan. Issues unable to be resolved shall be brought before this Regional Water Board for consideration of the need to adopt waste discharge requirements.

The Regional Water Board acknowledges that it does not have jurisdiction for direct enforcement of the rules and regulations of other local, state, or federal agencies. However, the Regional Water Board directs the Executive Officer to investigate the violation or threatened violation of those rules and regulations of other agencies which have been promulgated to protect the quality of the waters of the state within the North Coast Region and to appropriately enforce violations of the Water Code.

The violation of the following rules, regulations, or provisions may be considered a violation of the waste discharge prohibitions in this Action Plan and accordingly the Executive Officer shall take appropriate action.

1. A violation of current rules, regulations, or guidelines relating to water quality protection from any silvicultural herbicide application being conducted pursuant to permits issued by the County Agricultural Commissioners.
2. A violation of federal or state label requirements relating to water quality protection.

3. A violation of current rules, regulations, or guidelines of the DFA relating to water quality protection.

In accordance with this policy, limits have been determined for three herbicides. Accordingly, the following prohibitions apply to waste discharges from herbicide applications of 2,4,5-T, 2,4,5-TP, and 2,4-D:

1. There shall be no discharge of 2,4,5-T or 2,4,5-TP to waters of the State within the North Coast Region.
2. There shall be no discharge of 2,4-D PGBE ester to waters of the State within the North Coast Region that would cause the concentration of this substance in the receiving waters to exceed an instantaneous value of 40 parts per billion (ppb) acid equivalent or a 24-hour average of 2 ppb acid equivalent.

Monitoring programs will be designed to measure both the maximum instantaneous concentration and a statistically valid 24-hour average concentration of 2,4-D. Sampling locations for monitoring will be selected on the basis of the risk of discharge and the probable presence of beneficial water uses to be protected. Discharge monitoring will occur during and shortly after spraying and with stormwater.

Violations of water quality objectives contained in Chapter 4, particularly the objectives relating to pesticides and toxicity, shall be brought to the immediate attention of the County Agricultural Commissioner. In addition, the California Environmental Quality Act functional equivalent requirements of Section 21080.5 as adopted by the DFA and certified by the Resources Agency on November 1, 1979, require that the County Agricultural Commissioners meet quarterly with the Regional Water Board staff and other agencies concerned with resource protection. These quarterly consultations should develop needed mitigation to prevent violation of waste discharge prohibitions and Basin Plan objectives. The United States Forest Service has developed Best Management Practices for the application of herbicides and other pesticides on public lands to ensure protection of water quality. Accordingly,

1. The North Coast Regional Water Quality Control Board hereby accepts United States Forest Service Practices 5.8-5.14 as Best Management Practices (BMPs) for water quality protection from aerial herbicide application on Forest Service lands within the North Coast Region, and recognizes the "Aerial Herbicide Application Handbook" (FSH 2109.21) as a management practice that best protects water quality.
2. Experience gained over the past several years by the United States Forest Service on implementation of these management practices has led the Regional Water Board to conclude that discharges from aerial spray applications can be controlled such that: (1) past or present standards for protection of water quality are not violated, (2) Basin Plan water quality objectives are met, (3) most (99 percent) United States Forest Service spray application monitored result in less than 2 ppb of 2,4-D or similar herbicides being detected in receiving waters.
3. The Basin Plan contains provisions (as specified in the Action Plan above) for adequate descriptions of treatment areas and application practices, monitoring programs, and spill contingency planning that, combined with the implementation of Best Management Practices by the United States Forest Service or other entity, will result in the waiver of issuance of waste discharge requirements (excluding issuance of requirements under No. 4 below).

Adoption of waste discharge requirements are hereby waived as not contrary to the public interest when the United States Forest Service Best Management Practices are implemented, relevant Basin Plan provisions are followed, and water quality is protected.

4. Waste Discharge Requirements shall be issued on a case-by-case basis where the implementation of Best Management Practices proposed for specific projects will be insufficient for protection of water quality.

The State Legislature, Department of Food and Agriculture, and the County Agricultural Commissioners have developed a body of laws, regulations, and permit conditions for the application of herbicides and other pesticides on forest lands to ensure protection of water quality. Accordingly,

1. The North Coast Regional Water Quality Control Board accepts the practices conducted pursuant to the state pesticide regulatory program and the County Agricultural Commissioner regulatory program as Best Management Practices (BMPs) for water quality protection from aerial herbicide application on private lands within the North Coast Region, and recognizes the mitigation measures developed through permit

conditions set by the County Agricultural Commissioners as management practices that best protect water quality.

2. Experience gained over the past several years by private forest landowners on implementation of these management practices has led the Regional Water Board to conclude that discharges from aerial spray applications can be controlled such that: (1) past or present standards for protection of water quality are not violated, (2) Basin Plan water quality objectives are met, (3) most (98%) of private landowner spraying applications monitored result in less than 10 ppb of 2,4-D or similar herbicides being detected in receiving waters (92% result in less than 2 ppb.)
3. The Basin Plan (as specified in the Action Plan above) contains provisions for adequate descriptions of treatment areas and application practices, monitoring programs, and spill contingency planning that, combined with the implementation of Best Management Practices by private landowners, will result in the waiver of issuance of waste discharge requirements (excluding issuance of requirements under Number 4 below).

Adoption of waste discharge requirements are hereby waived as not contrary to the public interest when Best Management Practices are implemented, relevant Basin Plan provisions are followed, and water quality is protected.

4. Waste Discharge Requirements shall be issued on a case-by-case basis where the implementation of Best Management Practices proposed for specific projects will be insufficient for protection of water quality.

4.2.5 Policy In Support Of Restoration In The North Coast Region

To achieve the objectives of the Clean Water Act and Porter-Cologne, the Regional Water Board must take an active role in promoting the implementation of restoration projects that are expected to help restore the chemical, physical, and biological integrity of the waters within the North Coast Region.

Restoration projects are implemented for the purpose of eliminating, reducing or ameliorating a variety of conditions that can negatively impact aquatic ecosystems, including but not limited to: water pollution, eutrophication, desiccation, habitat simplification, species displacement, migration barriers, erosion from diverted streams, riparian zone disturbance, effects of climate change, or other impairments to the beneficial uses of waters of the State.

The Policy in Support of Restoration in the North Coast Region includes Resolution No. R1-2015-0001, which accomplishes the following: (1) recognizes the important role that restoration plays in restoring and maintaining water quality, (2) highlights some of the barriers that inhibit implementation of restoration projects, (3) describes the work being done by the Regional Water Board and its staff to support restoration, (4) describes the regulatory requirements for permitting restoration projects, and (5) provides direction on how the Regional Water Board and its staff will continue to promote and support restoration in the future.

4.2.6 Guidelines For Implementation Of Restoration Policy

The Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program requires that all current and proposed nonpoint source discharges be regulated under waste discharge requirements, waivers of waste discharge requirements, basin plan prohibitions, or some combination of these administrative tools. The implementation of restoration projects with potential to cause nonpoint source discharges of waste into waters of the State is regulated similarly to other types of nonpoint source activities.

The State and Regional Water Boards use permitting authorities to implement the requirements of applicable State policies and state and regional water quality control plans. Boards may permit or certify restoration projects that result in significant and sometimes unavoidable impacts (including temporary exceedances of water quality objectives) if it is shown that the project will result in long-term protection of beneficial uses and water quality. In issuing waste discharge requirements, the Regional Water Board may include a time schedule, subject to revision at the discretion of the Board and pursuant to the provisions of Water Code section 13263. Similarly, in issuing a water quality certification under the Clean Water Act section 401, the state certifies a federal project or a project required to obtain a federal permit with conditions to protect beneficial uses and meet water quality objectives. The state has discretion to condition the water quality

certification based on the circumstances of a specific project, and may include time schedules for achieving compliance.

The Basin Plan includes prohibitions that apply to restoration projects within the action plans for the Action Plan for the Garcia River Watershed Sediment TMDL (2002) and the Action Plan for the Klamath River Total Maximum Daily Loads Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in the Klamath River in California and Lost River Implementation Plan (2010). Both of these watershed-specific action plans describe the Regional Water Board's support for restoration efforts and provide methods for compliance with the prohibitions.

The Basin Plan also includes waste discharge prohibitions within the Action Plan for Logging, Construction, and Associated Activities. While useful as an enforcement tool to regulate certain nonpoint source or unpermitted discharges, the Action Plan for Logging, Construction, and Associated Activities is not necessary to regulate or enforce upon otherwise authorized restoration projects. Therefore, it shall not be construed to prohibit any restoration project subject to a permit or other order of the State or Regional Water Board.

4.3 TOTAL MAXIMUM DAILY LOADS

Section 303(d) of the federal Clean Water Act (33 USC §1313) requires that "Each state shall identify those waters within its boundaries for which the effluent limitations... are not stringent enough to implement any water quality standard applicable to such waters." The Clean Water Act requires states to establish a priority ranking for waters on the Section 303(d) list of impaired waters and to establish total maximum daily loads for such waters.

Total maximum daily load (TMDL) is the maximum amount of a pollutant that a body of water can contain and still achieve water quality standards. Strategies for implementing the pollution load reductions needed to achieve the TMDL and move the water body toward attainment of water quality standards may be adopted in several ways, as described by the Impaired Waters Policy below. When TMDL implementation strategies are incorporated into the Basin Plan, they are known as TMDL action plans.

This section of the Basin Plan contains (1) a description of policies and regulatory tools that are applicable to TMDLs, and (2) TMDL action plans for specific water bodies and pollutants. Future TMDL action plans will be added as they are approved. The background information used to develop each of the specific TMDL action plans will be retained with the administrative record for the Basin Plan amendment.

4.2.7 Policies & Regulatory Tools Applicable To TMDLS

4.3.1.1 State-wide Policies Affecting TMDLS

A. Impaired Waters Policy

The *Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options* (Impaired Waters Policy)¹³ is a state-wide policy that describes the process for developing and adopting TMDLs. In summary, the Impaired Waters Policy states that TMDLs may be adopted in any of the following ways:

1. TMDLs and TMDL implementation strategies may be adopted with a basin plan amendment or another regulation or policy for water quality control.
2. TMDLs and TMDL implementation strategies may be adopted with a permitting action, enforcement action, or other single regulatory action.
3. TMDLs and TMDL implementation strategies may be adopted with a resolution that certifies either that (1) a regulatory program has been adopted and is being implemented by another state, regional, local, or federal agency; or (2) a non-regulatory program is being implemented by another entity.

¹³ SWRCB Res. No. 2005-0050.

The Impaired Waters Policy also states that TMDLs and TMDL implementation strategies will be incorporated into the Basin Plan, even if they are initially adopted through a regulatory process that is not a basin plan amendment. This is in compliance with Sections 303(d)(2) and 303(e)(3) of the Clean Water Act.

B. Nonpoint Source Policy

Many water bodies in the North Coast Region are impaired by nonpoint sources (NPS) of pollution, such as sediment discharges and elevated water temperatures. Therefore, many of the following TMDL action plans focus on NPS pollution control.

The Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program (NPS Policy)¹⁴ is a state-wide policy that explains how existing permitting and enforcement tools will be used to address nonpoint sources of pollution. The NPS Policy states that all current and proposed NPS discharges must be regulated under waste discharge requirements (WDRs), waivers of WDRs, a basin plan prohibition, or some combination of these tools.

A NPS pollution control implementation program is a program developed to comply with WDRs, waivers of WDRS, or basin plan prohibitions. A NPS pollution control implementation program must contain five key elements, which are summarized as follows:

Key Element 1: Explanation of the purpose of the NPS pollution control implementation program and how it will meet water quality standards.

Key Element 2: Description of the management practices and other program elements that are to be used to meet water quality standards and an evaluation that ensures proper implementation.

Key Element 3: A time schedule with quantifiable milestones.

Key Element 4: Adequate monitoring.

Key Element 5: The potential consequences for failure.

4.3.1.2 Region-wide Policies Affecting TMDLs

A. Sediment TMDL Implementation Policy

The TMDL implementation strategy for sediment-impaired waterbodies in the North Coast Region is set forth in the *Total Maximum Daily Load Implementation Policy Statement for Sediment-Impaired Receiving Waters in the North Coast Region* (Sediment TMDL Implementation Policy).¹⁵

The Sediment TMDL Implementation Policy states that the Regional Water Board shall address sediment waste discharges on a watershed-specific basis and directs staff to take the following actions to control sediment waste discharges:

1. Rely on the use of existing permitting and enforcement actions. These actions are consistent with the NPS Policy.
2. Rely on the use of existing prohibitions, including any future amendments.
3. Pursue non-regulatory actions, such as Memoranda of Understanding, with other agencies and organizations.
4. Work with local governments and non-profit organizations to develop sediment control strategies, such as grading ordinances.
5. Encourage organizations and individuals to control sediment waste discharges and conduct watershed restoration activities.

¹⁴ SWRCB Res. No. 2004-0030. 23 CCR §2915

¹⁵ NCRWQCB Res. No. R1-2004-0087.

6. Focus on public outreach and education.
7. Develop a guidance document on sediment waste discharge control.
8. Develop a sediment TMDL implementation monitoring strategy.

B. Policy For The Implementation Of The Water Quality Objectives For Temperature

The strategy for implementing the intrastate and interstate water quality objectives for temperature in the North Coast Region is set forth in the Policy Statement for Implementation of the Water Quality Objective for Temperature in the North Coast Region.¹⁶ The Regional Water Board shall address sources of elevated water temperature region-wide but on a case-by-case basis in the context of a given permit or other action as appropriate and necessary to reduce impairments and prevent further impairment.

The water quality objectives for temperature shall be implemented through a combination of riparian management and other temperature controls as appropriate in nonpoint source control programs; permits and waivers, grants and loans, and enforcement actions; support of restoration projects; and coordination with other agencies with jurisdiction over controllable factors that influence water temperature.¹⁷ Controllable water quality factors affecting water temperature include, but are not limited to, any anthropogenic activity which results in the removal of riparian vegetation that provides shade to a waterbody, sediment discharges, impoundments and other channel alterations, the reduction of instream summer flows, and the reduction of cold water sources.

To attain and maintain the water quality objectives for temperature, the Regional Water Board and its staff will implement programs and collaborate with others in such a manner as to prevent, minimize, and mitigate temperature alterations associated with the following factors:

1. Activities with the potential to reduce riparian shading of waterbodies;
2. Activities with the potential to increase sediment delivery;
3. The quality, quantity, location and timing of effluent, storm water, and agricultural return flow discharges;
4. The location, size, and operation of in-channel impoundments with the ability to alter the natural temperature regime;
5. Actions with the potential to change stream channel geometry;
6. Activities with the potential to reduce instream flows or reduce sources of cold water, including cold water refugia.

This policy in no way limits the State Water Board or Regional Water Board's authority and discretion to develop riparian management measures and other measures as appropriate and necessary for a specific land use, activity, or geographic area, and in consideration of existing regulatory and non-regulatory programs in place that provide temperature protections.

The Regional Water Board shall take the following actions to achieve temperature objectives and implement temperature TMDLs, including EPA-established TMDLs:

1. Restore and maintain riparian shade,¹⁸ as appropriate, through nonpoint source control programs;

¹⁶ NCRWQCB Res. No. R1-2012-0013 is hereby incorporated by reference.

¹⁷ Section 13247 of the Porter-Cologne Water Quality Control Act requires other state offices, departments, and boards to carry out their activities in a manner that complies with water quality control plans approved or adopted by the state board.

¹⁸ The removal of vegetation that provides shade to a waterbody is a controllable water quality factor. Riparian shade-related temperature TMDL load allocations are based on the concept of "site-specific potential effective shade," which means the shade equivalent to that provided by topography and potential vegetation conditions at a site. Shade controls that are effective at correcting temperature impairments also operate to prevent impairments, and provide other water quality protections such as bank stability and filtering sediment and other waste discharges. The Regional Water Board has discretion on how to implement load allocations on a case-by-case basis. This policy is not intended to

permits and waivers, grants and loans, and enforcement actions; support of restoration projects; and coordination with other agencies with jurisdiction over controllable factors that influence water temperature, as appropriate.

2. Continue to implement the Sediment TMDL Implementation Policy as a means of addressing elevated water temperature associated with excess sediment discharges. Implement sediment controls consistent with the approach articulated in the Sediment TMDL Implementation Policy to address temperature concerns associated with sediment in areas not impaired by sediment.
3. Examine and address temperature impacts when developing and implementing permits or programs for nonpoint source activities. Consider and implement, where applicable, all available measures to prevent and control the elevation of water temperatures in permit or program development. Such measures shall include, but are not limited to, sediment Best Management Practices and cleanups, memoranda of understanding or agreement with other agencies, prohibitions against waste discharges, management of riparian areas to retain shade, and control and mitigation of tailwater and impoundments. Where appropriate, include monitoring requirements for incorporation into permits, programs, and other orders to confirm management actions required to prevent or reduce elevated temperatures are implemented and effective.
4. Address factors that contribute to elevated water temperatures when issuing 401 certifications, NPDES permits, Waste Discharge Requirements, or Waivers of Waste Discharge Requirements, or Prohibitions.
5. Use other regulatory, executive, and enforcement tools, as appropriate, to address elevated water temperatures and preserve existing cold water resources.
6. Support and encourage restoration projects that are designed to eliminate, reduce, or mitigate existing sources of temperature impairments. Administer, encourage, and support the use of grant funds to facilitate projects that address elevated water temperature concerns. Pursue non-regulatory actions with organizations, landowners, and individuals to encourage the control of elevated water temperatures, watershed restoration, and protection activities.
7. Continue to coordinate with the Division of Water Rights by participating in the water right application and petition process, providing monitoring recommendations, conducting joint compliance inspections, submitting data in support of 401 certifications related to water diversions and/or facilities regulated by the Federal Energy Regulatory Commission, and any other appropriate means to help ensure that the terms of water right permits and licenses are consistent with the water quality objectives for temperature.
8. Coordinate with the Division of Water Rights on the development of instream flow studies and flow objectives, as appropriate.
9. Provide cities, counties, state, and federal agencies guidance and recommendations on compliance with the water quality objectives for temperature. Work with local governments to develop strategies to address the prevention, reduction, and mitigation of elevated water temperatures, including, but not limited to, ordinances, general plans, and other management policies.
10. Identify statewide policies under development with implications for water temperature, collaborate with State Water Board counterparts, and provide recommendations and guidance with respect to this policy.
11. Develop and implement a region-wide water temperature trend monitoring program to assist the Regional Water Board in determining whether this Policy is effectively reducing and preventing elevated temperatures over the long-term.

predetermine precise parameters for riparian shade for a specific location or land use. Where non-Water Board programs provide riparian shade that result in attainment of water quality standards, the Regional Water Board will rely on and incorporate those programs.

12. Develop and maintain a temperature implementation workplan consistent with the Policy to prioritize efforts, track progress, and identify specific actions to address elevated water temperatures. The temperature implementation workplan shall describe specific actions that will be taken throughout the North Coast Region and set watershed priorities for addressing elevated water temperatures at a watershed-specific level. The temperature implementation workplan shall be presented to the Regional Water Board on a triennial basis.

4.3.1.3 Permitting and Enforcement Tools

The federal Clean Water Act and the California Water Code (CWC) authorize the Regional Water Board to use permitting and enforcement tools to control waste discharges and ensure attainment of water quality standards. The Regional Water Board shall use permitting and enforcement tools, when and where appropriate, to address waste discharges and ensure attainment of water quality standards and TMDLs.

I. Permitting Tools

Permitting tools include, but are not limited to, the authority to:

1. Require technical reports and reports on the conditions and operation of a facility, in accordance with CWC §13267.
2. Require monitoring reports, in accordance with CWC §13267.
3. Inspect a facility, in accordance with CWC §13267.
4. Permit the discharge of waste, or proposed discharge of waste, to waters of the state through Waste Discharge Requirements (WDRs), in accordance with Article 4 of the CWC. WDRs may take the form of individual or project-specific WDRs, watershed-specific WDRs, or general WDRs that are applicable to a specific activity.
5. Waive the requirement for a WDR, in accordance with CWC §13269.
6. Permit the discharge of waste to waters of the United States through National Pollutant Discharge Elimination System (NPDES) permits, in accordance with Section 402 of the Clean Water Act and CWC §13370.
7. Certify that proposed activities which require a federal permit or license comply with water quality standards, in accordance with Section 401 of the Clean Water Act.

Permits and waivers may apply to individuals, organizations, activities, and/or watersheds in the North Coast Region or the State of California.

II. Enforcement Tools

Enforcement tools include, but are not limited to, the authority to:

1. Require a time schedule of specific actions to be taken, in accordance with CWC §13300.
2. Issue a cease and desist order, in accordance with CWC §13301.
3. Issue a cleanup and abatement order, in accordance with CWC §13304.
4. Impose monetary liabilities or fines (administrative civil liabilities), in accordance with CWC §13268 and §13350.

Enforcement actions should be consistent with the State Water Board's *Water Quality Enforcement Policy*,¹⁹ adopted February 19, 2002, and as subsequently amended. The Enforcement Policy promotes a fair, firm, and consistent enforcement approach appropriate to the nature and severity of a violation.

4.2.8 Action Plan For The Garcia River Watershed Sediment TMDL

Note: The "*Action Plan for the Garcia River Watershed Sediment TMDL*" was approved by the North Coast Regional Water Quality Control Board, the State Water Resources Control Board, and the Office of Administrative Law under the more lengthy title of the "*Garcia River Watershed Water Quality Attainment Action Plan for Sediment.*"

The Garcia River watershed comprises approximately 73,223 acres in southwestern Mendocino County and discharges to the Pacific Ocean. In 1996, the state of California identified the Garcia River as a high-priority waterbody according to the requirements in Section 303(d) of the federal Clean Water Act (CWA). Section 303(d)(1)(A) of the CWA requires that states list those waters within its boundaries for which existing management practices are not sufficient to achieve water quality standards. The Garcia River was identified as a high-priority waterbody due to excessive sedimentation. Accelerated erosion from land use practices and other causes was identified as affecting the migration, spawning, reproduction, and early development of cold-water fish such as coho salmon and steelhead trout. When the Garcia River was designated a high-priority waterbody under the requirements of the CWA, the development of a Total Maximum Daily Load (TMDL) for the river became necessary.

As a result of the designation of the Garcia River as a high-priority waterbody under the guidelines of the CWA, landowners, land managers, resource protection agencies, and interested members of the public provided input in the preparation of the *Garcia River Watershed Water Quality Attainment Strategy for Sediment* (1997) (Strategy). The Strategy has been revised and renamed to reflect its role as a supporting document to a Basin Plan amendment and is now known as the *Reference Document for the Garcia River Watershed Water Quality Attainment Action Plan for Sediment* (Reference Document). The Reference Document and the Strategy are staff-level tools for landowners; land managers; interested public; and state, local and federal resource protection agency personnel to use as an aid for developing and implementing plans to reduce sediment delivery to the Garcia River and its tributaries. It also is useful for providing additional detail about the concepts that follow. It is a planning document that should be revised or updated over time as factors affecting sediment conditions are better understood. The following Action Plan describes the approach of the Regional Water Board to achieve sedimentation reduction and attain beneficial uses in the Garcia River watershed and serves as a phased TMDL, implementation plan, and monitoring plan for the Garcia River watershed. As a phased TMDL, it will be updated and revised, through Basin Plan amendments, based on new information gathered by Regional Water Board staff and/or submitted by landowners, other agencies, academic institutions and the public that provides an improved assessment of conditions in the Garcia River watershed.

I. Problem Statement

The Garcia River and its tributaries have experienced a reduction in the quality and amount of instream habitat that is capable of fully supporting the beneficial use of a cold-water fishery, due to increased sedimentation. This has resulted in a reduction in the stocks of coho salmon and steelhead trout. The acceleration of sediment delivery in the Garcia River watershed due to land management activities has resulted in the loss or reduction of pools necessary for salmonid rearing and the loss or degradation of potential spawning gravel. In addition, the loss or reduction of instream channel structure in the Garcia River watershed due to land management activities has contributed to this habitat loss or reduction.

II. Numeric Targets

The Numeric Targets, as derived from the scientific literature, focus on the elimination of sediment as a pollutant of concern, and provide instream water quality goals for restoring the cold-water fishery habitat. The Numeric Targets represent the desired future condition of the watershed, and are intended to be consistent with existing water quality objectives and beneficial uses, but are not themselves enforceable. The Numeric

¹⁹ SWRCB Res. No. 2002-0040. 23 CCR §2910.

Targets will be revised through Basin Plan amendments if additional site-specific data for the watershed or additional research support the need for revision. They are expected to be attained throughout the watershed by the year 2049. Table 4-3 provides the Numeric Targets for the Garcia River watershed.

III. Source Analysis

The analysis of sediment sources is divided into three components: mass wasting (primarily landslides), fluvial erosion (primarily from gullies), and surface erosion (primarily from rills and sheetwash). For each of these categories, data was reviewed to estimate the sediment delivery rate associated with natural background, roads (including but not limited to private, public, rural residential and skid trails), timber harvest units, and agricultural operations. Aerial photograph interpretation and road density data analysis were used to estimate the existing rates of sediment delivery from the above sources and from natural background, where the data was sufficient to do so. The estimates are contained in Table 4-4. Based on the existing data, at a minimum, the Garcia River watershed produced an average of 1,380 tons of sediment per square mile per year as measured from 1956 to 1996.

IV. Loading Capacity Calculation

Data from the Garcia River watershed were compared to those from other north coast watersheds with similar physical, climatic, and geologic characteristics to the Garcia River watershed. In particular, data from the North and South Forks of Caspar Creek, also located in western Mendocino County, were used to estimate the reduction in sediment loading needed to achieve the desired future condition in the Garcia River. South Fork Caspar Creek was heavily logged by ground-based equipment (tractors) up until the 1970s and is reported by Pacific Watershed Associates (1997) to produce 1,420 tons/mi²/yr of sediment. North Fork Caspar Creek, on the other hand, received very little tractor logging up through the 1970s and is reported by Pacific Watershed Associates (1997) to produce 680 tons/mi²/yr of sediment. The U.S. Environmental Protection Agency Region IX (USEPA) promulgated a TMDL for the Garcia River on March 16, 1998. In it, USEPA assumes that the condition of South Fork Caspar Creek is comparable to the existing condition of the Garcia River watershed and that North Fork Caspar Creek represents a reference for the desired future condition of the Garcia River watershed, a condition similar to that which existed to the steep decline in salmonid populations. As a result, a reduction in sediment delivery of 52 percent is identified as appropriate to achieve the desired future conditions in the Garcia River watershed $[(1420-680)/1420=0.52]$. Applying a margin of safety of 8 percent to account for uncertainties in the data and differences between the Garcia River watershed and the Caspar Creek watershed, an overall reduction in sediment loading of 60 percent is established. (Garcia River Sediment Total Maximum Daily Load, USEPA, Region IX, March 16, 1998).

Table 4-3 Numeric Targets for the Garcia River Watershed

<u>PARAMETER</u>	<u>NUMERIC TARGET</u>
Migration barriers on Class I watercourses ¹	Zero human-caused barriers
Embeddedness on Class I watercourses	Improving trend ²
Percent fines < 0.85 mm on Class I watercourses	<14 percent
Percent fines < 6.5 mm on Class I watercourses	<30 percent
Primary pool frequency in Class I watercourses ³	Primary pools covering 40 percent of the length of the watercourse
V* in 3rd order streams with slopes between 1 percent and 4 percent ⁴	<0.21 (mean) <0.45 (max)
Median particle size diameter (d ₅₀) in 3rd order stream with slopes between 1 percent and 4 percent	>69 mm (mean) >37 mm (min)
Large woody debris in Class I, II, and III watercourses	Improving trend ⁵
Width-to-depth ratio in Class I, II, and III watercourses	Improving trend ⁶
Thalweg profile in Class I, II, and III watercourses	Increasing variability around the mean
Inman, Signal and Hathaway (Planning Watersheds 113.70014, 113.70020 and 113.70026 except mainstem)	0 percent open stream channel ⁷

PARAMETER	NUMERIC TARGET
Pardaloe, Larmour, Whitlow, and Blue Waterhole and North Fork (Planning Watersheds 113.70010 – 113.70013 and 113.70025)	<1 percent open stream channel
Rolling Brook (Planning Watershed 113.70024)	<3 percent open stream channel
Graphite, Beebe (Planning Watersheds 113.70021 – 113.70022)	<6 percent open stream channel
South Fork (Planning Watershed 113.70023)	<20 percent open stream channel

- ¹ Class I watercourses are watercourses that contain domestic water supplies, including springs, on site and/or within 100 feet downstream, or have fish always or seasonally present onsite, or contain habitat to sustain fish migration and spawning. Class I watercourses include historically fish-bearing watercourses.
Class II watercourses are watercourses that have fish always or seasonally present offsite within 1000 feet downstream, or contain aquatic habitat for non-fish aquatic species. Class II watercourses do not include Class III watercourses that are directly tributary to Class I watercourses.
Class III watercourses are watercourses that do not have aquatic life present, but show evidence of being capable of sediment transport to Class I and II watercourses under normal high flow conditions during and after completion of land management activities.
- ² Embeddedness measures the degree to which the larger particles (boulders, rubble, or gravel) of watercourse channels are surrounded or covered by fine sediment, impeding the ability of fish to dig an adequate redd, or nest. Measurements are generally recorded as 0-25 percent, 25-50 percent, 50-75 percent, or 75-100 percent embedded. An improving trend would be represented by a decrease in embeddedness as measured over a rolling 10 year period.
- ³ Primary pools have a depth greater than three feet at the pool's deepest point, a width greater than one-half the width of the low flow channel at the pool's widest point (measured by a transect perpendicular to flow), and a length greater than the width of the low-flow channel at the pool's longest point (measured by a transect parallel to flow). Primary pool frequency will be measured by surveying segments of the watercourse that provide a statistically significant representation of the watercourse as a whole and are located based on field conditions.
- ⁴ V* is a numerical value that represents the proportion of fine sediment that occupies the scoured residual volume of a pool. Stream order is the designation of the relative position of stream segments in the drainage basin network. For example, a first order stream is the smallest, unbranched, tributary that terminates at the upper point. A second order stream is formed when two first order streams join.
- ⁵ An improving trend in large woody debris would be represented by an increase in the volume of large woody debris measured within a given stream segment over a rolling 10 year period. Large woody debris is defined as a piece of woody material having a diameter greater than 30 cm (12 inches) and a length greater than 2 m (6 feet) that is located in a position where it is in the watercourse channel or may enter the watercourse channel.
- ⁶ An improving trend in the width-to-depth ratio would be represented by a change over a rolling 10 year period in the existing width-to-depth ratio towards the width-to-depth ratio appropriate for the stream channel type in question, as determined using the Rosgen stream classification system described in *Applied River Morphology* (1996) by Dave Rosgen.
- ⁷ Open stream channels are those segments of channel, as viewed in aerial photographs with a 1:24,000 resolution or better, that are not covered by canopy and thus are visible.

Table 4-4 Average Annual Sediment Load

(Derived from: *Garcia River Sediment Total Maximum Daily Load, Table 16*, promulgated by USEPA, Region IX on March 16, 1998)

SOURCE	ESTIMATED AVERAGE ANNUAL SEDIMENT LOAD (tons/mi ² /yr)
Natural Background	
<input type="checkbox"/> Mass wasting	162
<input type="checkbox"/> Fluvial erosion	Insufficient data
<input type="checkbox"/> Surface erosion	Insufficient data
Roads (including skid trails)	
<input type="checkbox"/> Mass wasting	486
<input type="checkbox"/> Fluvial erosion	532
<input type="checkbox"/> Surface erosion	38
Timber Harvest Units	
<input type="checkbox"/> Mass wasting	162
<input type="checkbox"/> Fluvial erosion	Insufficient data
<input type="checkbox"/> Surface erosion	Insufficient data

<u>SOURCE</u>	<u>ESTIMATED AVERAGE ANNUAL SEDIMENT LOAD (tons/mi²/yr)</u>
Agricultural Operations	
<input type="checkbox"/> Mass wasting	Insufficient data
<input type="checkbox"/> Fluvial erosion	Insufficient data
<input type="checkbox"/> Surface erosion	Insufficient data
TOTAL	1,380

A 60 percent reduction of the average annual sediment load to the Garcia River watershed (1,380 tons/mi²) results in a Loading Capacity of 552 tons/mi²/yr [a) 1,380 X 0.60=828; b) 1,380-828=552]. The loading capacity of 552 tons/mi²/yr is a conservative estimate based on the best available data, and will be measured over a 40-year period. This loading capacity is the TMDL for the purposes of 40 CFR 130.2 and 130.7. As a phased TMDL, the loading capacity can be modified through a Basin Plan amendment if new information is made available that supports such modification. Neither the order of magnitude of the overall sediment budget nor that of the loading capacity is expected to change significantly as a result of new information.

V. Load Allocations

The existing data are insufficient to allocate specific components of the TMDL to individual landowners or to individual land management activities. That is, it does not include estimates of sediment delivery from individual properties, all landuse, or the amount of sediment delivery that can be reasonably controlled. These three elements are necessary to form rational individual load allocations.

To address the limitations in the existing data, a general load allocation is developed as follows. It is phased, as contemplated in a phased TMDL. First, landowners are required to inventory the Sediment Delivery Sites on their property. Sediment Delivery Sites are controllable, human-caused erosion sites that are currently eroding or have the potential to erode in such a manner as to deliver sediment to a watercourse. Landowners are then directed to reduce the controllable volume of sediment at the inventoried Sediment Delivery Sites. Correction or control of these sites is required according to a schedule contained in the Implementation Schedule section. Landowners are also directed to assess their property for Unstable Areas. Unstable Areas are areas with a naturally high risk of erosion and areas or sites that will not reasonably respond to efforts to prevent or mitigate sediment discharges. Finally, landowners are directed to implement protective land management measures designed to control future sediment delivery from land management activities on the identified unstable areas and on riparian areas, and from activities related to roads, skid trails, landings, agricultural facilities, and gravel mining. These practices are to be implemented in accordance with the schedules contained in the Implementation Section.

In short, as the first phase, landowners are directed to identify and control all existing and future controllable discharges of sediment. Controllable discharges are those discharges resulting from human activities that can influence the quality of waters of the State and that can be reasonably controlled by prevention or mitigation. For the purposes of the TMDL equation, the load allocation is expressed as zero controllable discharges. For the purpose of implementation and as noted in Table 4-5, it is recognized that measures to control discharges are not 100 percent effective. In the absence of additional data, the Regional Water Board judges that this program of source identification and source control will result, over time, in a reduction in the rate of sediment delivered to watercourses in the Garcia River watershed that is comparable to the rate that existed prior to the steep decline in salmonid populations and attainment of the desired future conditions. As per the Loading Capacity Calculation, that level of sediment delivery is estimated to be 552 tons/mi²/yr. Should additional data be made available to the Regional Water Board that supports a revision to the Load Allocation, the Regional Water Board will consider such revisions in a Basin Plan Amendment.

VI. Implementation Plan

The Implementation Plan is intended to control existing and future sources of sediment delivery resulting from human activity to the Garcia River and its tributaries. To control these sources, three options are offered to landowners. These options are:

Option 1. Comply with the waste discharge prohibitions that apply within the Garcia River watershed.

Option 2. Comply with an approved Erosion Control Plan and an approved Site-Specific Management Plan, or

Option 3. Comply with an approved Erosion Control Plan and the Garcia River Management Plan.

Waste Discharge Prohibitions that Apply within the Garcia River Watershed

The following waste discharge prohibitions apply within the Garcia River watershed:

1. The controllable discharge of soil, silt, bark, slash, sawdust, or other organic and earthen material from any logging, construction, gravel mining, agricultural, grazing, or other activity of whatever nature into waters of the State within the Garcia River watershed is prohibited.
2. The controllable discharge of soil, silt, bark, slash, sawdust, or other organic and earthen material from any logging, construction, gravel mining, agricultural, grazing, or other activity of whatever nature to a location where such material could pass into waters of the state within the Garcia River watershed is prohibited.

Controllable discharges are those discharges resulting from human activities that can influence the quality of the water of the State and that can be reasonably controlled through prevention, mitigation or restoration. The above two waste discharge prohibitions replace the region-wide waste discharge prohibitions contained in the action plan for logging, construction, and associated activities. The region-wide waste discharge prohibitions no longer apply to activities in the Garcia River watershed. The above two prohibitions do not apply to landowners who are conducting their land management activities in accordance with an approved Erosion Control Plan *and* either an approved Site-Specific Management Plan or the Garcia River Management Plan (Options 2 and 3, respectively). If the Regional Water Board finds that significant discharges or threatened discharges of sediment occur despite the implementation of an approved Erosion Control Plan and either an approved Site-Specific Management Plan or the Garcia River Management Plan, it will consider the need to revise the plans and will consider the issuance of a Cleanup and Abatement Order to address the discharge, but it will not impose administrative civil liabilities for violations of the prohibitions.

All landowners choosing either Option 2 or 3 as described above must submit an Erosion Control Plan. The general purpose of the Erosion Control Plan is to outline the program by which a landowner or landowners will identify areas of sediment delivery, identify areas at risk of sediment delivery, and control all sediment delivery associated with past and present land management activities. The necessary components of an Erosion Control Plan are enumerated below.

In addition, landowners choosing Option 2 must submit a Site-Specific Management Plan. Those choosing Option 3 must comply with the Garcia River Management Plan, as outlined below. (The Site-Specific Management Plan and Garcia River Management Plan are collectively referred to as Management Plans.) The general purpose of the Management Plans is to outline the program by which a landowner or landowners will manage their property or properties to reduce the future risk of initiating new sediment delivery problems and to increase the ability of the Riparian Management Zone to properly function with regard to sediment filtering, large woody debris recruitment and stream bank stabilization.

A Site-Specific Management Plan differs from the Garcia River Management Plan. With the Site-Specific Management Plan, the landowner is able to select land management measures for controlling sediment that are suitable for the specific activities and conditions on his or her land. In the Garcia River Management Plan, more general land management measures are specified for unstable areas and riparian areas, and for activities related to roads, skid trails, landings, near stream facilities, and gravel mining. The Regional Water Board strongly encourages all landowners to prepare Site-Specific Management Plans and to use the Garcia River Management Plan only until they can develop their own plans to control discharges of sediment from their properties. The Regional Water Board also encourages groups of dischargers with similar land management activities to develop collective watershed-based Erosion Control Plans and Site-Specific Management Plans (Group Plans), where appropriate.

Erosion Control Plans, Site-Specific Management Plans, and the Garcia River Management Plan are not independently enforceable. The submission of an Erosion Control Plan and Site-Specific Management Plan

by a landowner does not create an obligation by the landowner to implement the plans. However, if the landowner chooses not to implement the plans, then Option 1 will apply. In addition, none of the land management measures contained in a Management Plan shall be construed as a gift or dedication of private lands to the general public. A landowner may submit to the Executive Officer a request for an interim extension of time to develop or implement either the Erosion Control Plan or the Management Plan. If the Executive Officer determines that the landowner is making a good faith effort to develop or implement the plans in accordance with the final timelines described in the Implementation Schedule, the extension will be granted. A landowner who is not making a good faith effort to develop or implement an Erosion Control Plan and a Management Plan is subject to the above prohibitions (Option 1).

The elements of an approvable Erosion Control Plan and Site-Specific Management Plan are described below. In addition, the Garcia River Management Plan is outlined in detail. Erosion Control Plans must be submitted no later than January 3, 2005. Site-Specific Management Plans can be submitted at any time. The Garcia River Management Plan must be implemented by January 3, 2002 or substituted by an approved Site-Specific Management Plan.

Elements of an Erosion Control Plan

1. Baseline Data Inventory

A Baseline Data Inventory includes an ownership-wide inventory of Sediment Delivery Sites. Sediment Delivery Sites are controllable, human-caused erosion sites that are currently eroding or have the potential to erode in such a manner as to deliver at least 10 cubic yards of sediment to a watercourse over the life of the TMDL. They include such features as undersized culverts, culverts with diversion potential, eroding sidecast or fill, downcutting inside ditches, etc.

The Baseline Data Inventory shall include a description of all active and potential sediment sources resulting from roads, landings, skid trails, timber operations and agricultural operations, and other significant human-caused earth movement activities that have or might have the ability to enter waters of the state.

The Baseline Data Inventory shall include, at a minimum:

- A description of the inventory method used;
- A topographic map with 80 foot intervals showing the ownership boundary and the location of all inventoried sites, as well as roads and drainages; and
- For each site, an estimate of the volume of sediment and the relative potential for sediment delivery.

The Baseline Data Inventory must be comprehensive and may follow as examples, completely or in part, the inventory methods described in the *Assessment and Implementation Techniques for Road-Related Sediment Inventories and Storm-Proofing* and contained in the draft *Sustained Yield Plan/Habitat Conservation Plan* for the Pacific Lumber Company (August 25, 1997, Appendix 20, prepared by William Weaver, of Pacific Watershed Associates, Inc.); the *STAR* Worksheet system of the *Watershed and Aquatic Habitat Assessment* (September 29, 1997, Appendix 6:1 prepared by Coastal Forestlands, Ltd.); or the *Sediment TMDL Inventory and Monitoring Worksheet* developed by U.C. Davis (1998).

2. Sediment Reduction Schedule

The Sediment Reduction Schedule shall describe how and in what order of priority the sediment discharges from the Sediment Delivery Sites identified in the Baseline Data Inventory will be reduced in accordance with the schedule set forth in *Table 4-5* of the Implementation Schedule section. The Baseline Data Inventory described in 1. above shall be used when prioritizing and conducting sediment delivery reduction activities, and the highest priority for sediment delivery reduction shall be assigned to those sites with the greatest potential to discharge sediment to a watercourse that supports fish.

3. Assessment of Unstable Areas

The Assessment of Unstable Areas shall identify through modeling, data analysis and/or a field inventory, areas of instability across the property. Unstable Areas are areas with a naturally high risk of erosion and areas or sites that will not reasonably respond to efforts to prevent, restore or mitigate sediment discharges. Unstable Areas are characterized by slide areas, gullies, eroding stream banks, or unstable soils that are capable of delivering sediment to a watercourse. Slide areas include shallow and deep seated landslides, debris flows, debris slides, debris torrents, earthflows, headwall swales, inner gorges and hummocky ground. Unstable soils include unconsolidated, non-cohesive soils and colluvial debris.

The Assessment of Unstable Areas shall include, at a minimum:

- All known active and potential shallow and deep-seated landslides, debris flows, debris slides, debris torrents, earthflows, headwall swales, inner gorges, and unstable soils.
- All known active or potentially active gullies and streambank erosion sites, as appropriate, but should not include the sites identified in 1. above.

Preparers of the Assessment of Unstable Areas may but are not required to use existing California Department of Conservation maps such as the series entitled "Geology and Geomorphic Features Related to Landsliding" or a digital terrain-type model like the one developed by Louisiana Pacific Corporation in its draft *Sustained Yield Plan for Coastal Mendocino County* (1997) in combination with field-based maps of Unstable Areas.

4. Monitoring Plan

The Monitoring Plan shall describe the method for monitoring the effectiveness of the sediment control efforts the landowner or group of landowners has implemented for the Sediment Delivery Sites identified in the Baseline Data Inventory. The monitoring method must be consistent with the submitted Baseline Data Inventory method so that results are comparable from year to year. The results of the sediment control efforts and any other erosion control related activities, including the implementation of land management measures, shall be submitted to the Regional Water Board in an annual report, due January 30. Any changes in ownership or primary land management activities shall also be included in the annual report. In addition, individual landowners are encouraged to establish instream monitoring points above and below any significant land management activity on their properties and in potential anadromous fish refugia. (See Monitoring section, below).

Elements of a Site-Specific Management Plan

1. Description of Land Management Measures to Control Sediment Delivery

A Site-Specific Management Plan shall include a description of, and schedule for, the Land Management Measures the landowner proposes to implement to control the future delivery of sediment from the following land management activities:

- Roads, landings, skid trails, watercourse crossing construction, reconstruction, maintenance, use, and obliteration;
- Operations on unstable slopes;
- Use of skid trails and landings;
- Use of near stream facilities, including agricultural activities; and
- Gravel mining.

In addition, the description must include:

- A Long-term Road System Plan (Road Plan) similar to that described below in the Garcia River Management Plan, and

- Supporting information that demonstrates that the proposed Land Management Measures will provide a level of water quality protection that is roughly equivalent to that expected from the corresponding measures of the Garcia River Management Plan.

2. Description of Land Management Measures to Improve the Condition of the Riparian Management Zone

The Site-Specific Management Plan shall include a description of, and schedule for, the Land Management Measures and any restoration activities the landowner proposes to improve or maintain the condition of the Riparian Management Zone such that it provides:

- Stream bank protection,
- Filtering of eroded material prior to its entering the watercourse channel, and
- Recruitment of large woody debris to the watercourse channel and flood plain.

In addition, the description shall include supporting information that demonstrates that the proposed Land Management Measures will provide a level of water quality protection that is roughly equivalent to that expected from the corresponding riparian measures of the Garcia River Management Plan.

Group Plans

Dischargers with similar land management activities may choose to develop collective Erosion Control Plans and Management Plans (Group Plans). Group Plans offer landowners the ability to work together to solve their erosion problems, while also affording a measure of privacy to the members of the Group. The Group Plan shall clearly indicate the members of the Group and the land that is covered under the Group Plan. Where a Group member has multiple land management activities (e.g., ranching and timber harvesting), the Group Plan will cover only that portion of the member's land that is used for land management activities that are similar to those of the remainder of the Group.

The Implementation Plan applies to Groups in the same manner as it applies to individual landowners except as noted below. A Group Erosion Control Plan shall contain the same elements and level of detail as an individual Erosion Control Plan, with the following exceptions. (1) The Baseline Data Inventory Map shall show the perimeter boundary of the land covered by the Group Plan, but it does not need to depict the members' interior ownership boundaries. Shading or cross-hatching shall be used to depict any properties within the perimeter that are not covered by the Group Plan. (2) The Baseline Data Inventory Map shall show the location of the Group's Sediment Delivery Sites, but the specific Sediment Delivery Sites do not need to be associated with any individual landowner. (3) The Sediment Reduction Schedule shall be consistent with the schedule in Table 4-5, but the sediment control work may be prioritized on a Group basis, rather than an individual landowner basis. (4) The Assessment of Unstable Areas does not need to be associated with any individual landowner. The Group Management Plan shall include the elements of either a Site Specific Management Plan or the Garcia River Management Plan (or a combination of the two), but the management measures shall be associated with the Group, rather than any of the individual landowners.

All members of the Group are responsible for ensuring that the Group Plans are developed and implemented. The waste discharge prohibitions do not apply to any of the members of the Group as long as the approved Group Plans are being implemented. If the Group Plan is not developed or implemented due to a member's failure to make a good faith effort to develop or implement the Group Plan, then that individual member of the Group is subject to the Prohibitions. Membership in a Group shall be based upon consent of all the members of the Group. The Group may change its membership by submitting a revised Group Plan for approval by the Executive Officer.

Relation of Other Planning Efforts to Erosion Control Plans and Management Plans

The Regional Water Board does not intend for landowners to engage in duplicative or overly complex planning efforts if they are already involved in planning efforts that will satisfy the requirements of this Basin Plan Amendment. For example, the Regional Water Board will consider all of the following to be approvable as an Erosion Control Plan and Management Plan, as long as three conditions are met. First, the document(s) must include, or be modified to include, the elements described above. Second, the document(s) must demonstrate water quality protection and restoration for the area of ownership that is roughly equivalent to the Garcia River

Management Plan. Third, the document(s) must provide an assurance that the Implementation Schedule will be met.

- Non-Industrial Timber Management Plans
- Sustained Yield Plans
- Habitat Conservation Plans
- Letters of Intent followed by Ranch Plans as described in the California Rangeland Water Quality Management Plan (July 1995)
- Timber Harvest Plans that cover entire ownerships

The Garcia River Management Plan

The term "roads" as used in the Garcia River Management Plan include private roads, public roads, rural residential roads, skid trails, and landings. The term "near stream facility" includes any building, equipment, corral, pen, pasture, field, trail, livestock crossing or other feature or structure which is associated with commercial land use operations and is close enough to any watercourse to have the potential to cause the discharge of sediment to the watercourse. The term "feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technical factors.

Land Management Measures That Apply To Roads, Watercourse Crossings, and Near Stream Facilities Throughout the Garcia River Watershed

1. By January 3, 2005, a Long-term Road System Plan (Road Plan) shall be developed and submitted which describes the long-term road system, and identifies all roads and watercourse crossings. The road system described in the Road Plan shall be designed and constructed to provide surfacing, drainage, and watercourse crossings to match the intended road use and maintenance abilities. Roads (including road prism and watercourse crossing drainage structures) that are constructed or reconstructed after January 3, 2002, shall comply with the standards below. Existing usable roads will be scheduled for upgrading as necessary as Sediment Delivery Sites under the Erosion Control Plan. Roads that are not needed as part of the long-term road system and that discharge or threaten to discharge earthen material to waters of the state shall be scheduled as necessary for abandonment or obliteration as Sediment Delivery Sites under the Erosion Control Plan. The road plan shall include, at a minimum:
 - The location of all roads and watercourse crossings within the ownership,
 - The current status of each road, including road surface material, road and watercourse design, and use restrictions, and
 - The future plan and schedule for each road.
 - A. Roads used year round shall be designed, constructed, reconstructed or upgraded to permanent road status with the application of an adequate layer of competent rock for surface material and the installation of permanent watercourse crossings and road prism drainage structures. These roads shall receive regular and storm period inspection and maintenance.
 - B. Roads used primarily during the dry season but to a limited extent during wet weather shall be designed, constructed, reconstructed or upgraded to seasonal road status with the application of spot rocking where needed to provide a stable running surface during the period of use. These roads shall be designed, constructed, reconstructed, and upgraded to provide permanent watercourse crossings and road surface drainage structures. These roads shall receive inspection at least once during the wet weather period and shall receive at least annual maintenance.
 - C. Roads that are not used or maintained during wet weather shall be constructed or reconstructed to a temporary road status. Spot rocking of the road surface shall be used, where needed, to provide a stable running surface during the period of use. Road surface drainage structures shall be designed and constructed to prevent erosion so that regular and storm period maintenance is not needed to prevent sediment discharge to watercourses. All roads that will not receive at least annual

maintenance shall have watercourse crossings, except rock fords, removed prior to October 15 of each year of installation.

2. All watercourse road crossings shall, at a minimum, utilize the standards described on pages 64 - 79 of the Handbook for Forest and Ranch Roads (prepared by Weaver and Hagans, 1994). These standards include but are not limited to the design and installation of permanent crossings using a culvert with a minimum diameter designed to pass at least a 50-year flood frequency event. Larger diameter culverts shall be used if debris that might result in blockage of the culvert inlet is present in the channel. All crossings shall be designed and installed to prevent the diversion of stream flow down or through the road prism in the event of culvert failure, and to provide free passage to fish at all flow regimes. All watercourse road crossings that do not meet these minimum standards as of January 3, 2002, must be scheduled as necessary for upgrade as Sediment Delivery Sites under the Erosion Control Plan. All watercourse road crossings installed after January 3, 2002, must be installed according to these minimum standards.
3. All road design, construction, and reconstruction shall use, at a minimum, the standards described on pages 39 - 54 and 81 - 120 of the Handbook for Forest Ranch Roads (prepared by Weaver and Hagans, 1994). These standards include but are not limited to the outsloping of the road prism (whenever feasible and safe) and the installation of rolling dips (rather than water bars) for additional road drainage. If insloped roads are necessary, ditch relief culverts shall be installed, at a minimum, at the distances described in Table 20 of the Handbook for Forest and Ranch Roads, and located to prevent discharge of road drainage directly onto erodible soils. All roads that do not meet the minimum standards as of January 3, 2002, must be scheduled as necessary for upgrade as Sediment Delivery Sites under the Erosion Control Plan. All roads constructed or reconstructed after January 3, 2002, must be constructed or reconstructed to these minimum standards.
4. Straw bale check dams or silt fences shall be installed at the outlet of all road drainage structures prior to use of the road for all roads used after January 3, 2002, if less than one hundred feet of 90 percent vegetative buffer exists between the outlet and a watercourse. Road drainage structures with less than one hundred feet of 90 percent vegetative buffer that are associated with roads not in use after January 3, 2002, must be scheduled as necessary for upgrade as Sediment Delivery Sites.
5. After January 3, 2002, there shall be no construction, reconstruction, or use of roads within the channel of any watercourse. This measure does not apply to watercourse crossings.
6. After January 3, 2002, there shall be no construction, reconstruction, or use of skid trails on slopes greater than 40 percent within 200 feet of a watercourse, as measured from the channel or bankfull stage, whichever is wider.
7. After January 3, 2002, there shall be no use of roads or near stream facilities, when the activity contributes to the discharge of visibly turbid water from the road or near stream facility surface or is flowing in an inside ditch in amounts that cause a visible increase in the turbidity of a watercourse. As an exception, short-term, temporary use of near stream facilities may occur if there is no feasible alternative.
8. After January 3, 2002, the use of heavy equipment (defined as 1.5 tons) between October 15 and May 1 shall be limited to roads that have permanent drainage and are surfaced with an adequate layer of rock to maintain a stable road surface throughout the period of use. A stable road surface is defined as a surface that does not allow the concentration of road runoff to the extent that depressions or rills that are capable of channeling water are formed on the road surface. On near stream facilities, use of heavy equipment in this time period shall be limited to facilities with drainage collection and storage capabilities and/or facilities with a stable soil surface throughout the period of use. As an exception, short-term, temporary use of heavy equipment on near stream facilities may occur if there is no feasible alternative.
9. After January 3, 2002, all roads and other near stream facilities that are actively used shall have drainage and/or drainage collection and storage facilities installed before the start of any rain that causes overland flow across or along the disturbed surface and could result in the delivery of sediment to a watercourse. Roads and near stream facilities that are no longer actively used and have the potential to discharge sediment to a water of the state shall be addressed as necessary as Sediment Delivery Sites.

10. After January 3, 2002, there shall be no road construction, reconstruction, or upgrading from October 15 to May 1, except for emergency road maintenance.
11. After January 3, 2002, all new crossings installed as temporary watercourse crossings and designed to carry less water and debris than predicted for a 50 year flood discharge shall be removed and stabilized by October 15 of each year of installation. For all watercourses, the approaches to all temporary watercourses crossings shall be pulled back to create side slopes of less than 50 percent, and stabilized with rock, grass seed, mulch, or slash from the lowest (closest) drainage structure to the watercourse transition line. Existing temporary watercourse crossings not removed and stabilized by January 3, 2002, shall be addressed as necessary as Sediment Delivery Sites.
12. After January 3, 2002, off-channel water drafting and livestock watering locations shall be developed to the extent feasible.

Land Management Measures That Apply in Unstable Areas – effective date January 3, 2002

1. No road construction shall occur across unstable areas without the field review and development of site specific mitigation measures by a Certified Engineering Geologist registered in the State of California. A report prepared by the Certified Engineering Geologist shall be submitted to the Regional Water Board before construction/ reconstruction activities begin.
2. No more than 50 percent of the existing basal area formed by tree species shall be removed from unstable areas that have the potential to deliver sediment into a watercourse.
3. No concentrated flow shall be directed across the head, toe, or lateral margin of any unstable area.
4. Agricultural activities on unstable slopes that have the potential to deliver sediment to a water of the state shall be minimized to the extent practical.

Land Management Measures That Apply in the Riparian Management Zone

A Riparian Management Zone width shall be assigned to each watercourse based on the class of the watercourse. For Class I and II watercourses, the Riparian Management Zone is a 100-foot strip of land on each side of, and adjacent to, the watercourse. For Class III watercourses, the Riparian Management Zone is a 50-foot strip of land on each side of, and adjacent to, the watercourse. The Riparian Management Zone shall be measured from the active channel or bankfull stage, whichever is wider.

1. All roads within the Riparian Management Zone used after January 3, 2002, shall be surfaced with competent rock to a sufficient depth prior to use of the road to prevent road fines from discharging into watercourses.
2. After January 3, 2002, any new soil exposure within the Riparian Management Zone caused by land management activities shall be stabilized with the application of grass seed, mulch, slash or rock before October 15 of the year of disturbance. Stabilization measures shall achieve at least 90 percent coverage of all soil within the Riparian Management Zone exposed by land management activities. Existing exposed soil caused by land management activities that is not stabilized prior to January 3, 2002, shall be addressed as Sediment Delivery Sites.
3. After January 3, 2002, to promote stream bank stability, each landowner shall ensure that there are no commercial land management activities, including commercial or salvage timber harvest, grazing or crop agriculture, within the first 25 feet of the Riparian Management Zone for Class I or II watercourses. This measure does not apply to watercourse crossings. Commercial land management activities existing prior to January 3, 2002, must be phased out by January 3, 2007.
4. After January 3, 2002, in order to maintain present levels and promote future instream large woody debris, each landowner shall restrict commercial land use activities within the Riparian Management Zone to ensure that:

- A. There is no removal of downed large woody debris from watercourse channels unless the debris is causing a safety hazard.
- B. On Class I and II watercourses, at least five standing conifer trees greater than 32 inches in diameter at breast height (DBH) are permanently retained at any given time per 100 linear feet of watercourse. Where sites lack enough trees to meet this goal, there shall be no commercial harvest of the five largest diameter trees per 100 linear feet of watercourse.
- C. There is no removal of trees from unstable areas within a Riparian Management Zone that have the potential to deliver sediment to a water of the State unless the tree is causing a safety hazard.

Land Management Measures That Apply to Gravel Mining in the Garcia River Watershed – effective date January 3, 2002

1. In-channel gravel mining shall follow the following recommendations from the *Garcia River Gravel Management Plan*, prepared for the Mendocino County Water Agency, August 1996.

- A. Establish an Absolute Elevation below Which No Extraction May Occur. The absolute elevation below which no mining could occur would be surveyed on a site specific basis. A “redline” elevation tied to National Geodetic Vertical Datum of 1929 (NGVD) or North American Vertical Datum (NAVD) should be established below which mining may not take place, in order to avoid impacts to structures such as bridges and to avoid vegetation impacts associated with downcutting due to excess removal of sediment. A redline elevation should be 2 feet above the low flow water surface elevation (at the edge of the bar closest to the low flow channel) during the first year following adoption of the gravel management plan (assuming that this will occur in 1996) [note: The Mendocino County adopted the Gravel Management Plan on December 9, 1996]. A 2-foot minimum elevation as a buffer with a 2% grade toward the bank is consistent with that required by the National Marine Fisheries Service (NMFS).
- B. Limit In-channel Extraction Methods To “Bar Skimming” or an Alternative Method Recommended by the Mendocino County Data Evaluation Team. If mining is limited to the downstream end of the bar as described above with a riparian buffer on both the channel and hillslope (or floodplain) side, bar skimming would minimize impacts. Other methods such as excavation of trenches or pools in the low flow channel lower the local base level, and maximize upstream (headcutting and incision) and downstream (widening and braiding) impacts. In addition, direct disturbance of the substrate in the low flow channel should be avoided. Trenching on bars (described in the Eel River EIR; EIP, 1992) may be beneficial in the future for the Garcia if it becomes severely aggraded, flat, shallow, and braided and has few invertebrates. The Department of Fish and Game should be consulted in order to determine if the Garcia River meets these conditions in the future. In the future, the Mendocino County Data Evaluation Team should have flexibility to decide on the most appropriate method to enhance habitat on a site specific basis.

An excavated pool (or larger in-stream pit) acts as a local base level, and can cause upstream and downstream incision as the channel re-establishes its gradient. Incision is a negative effect of trenching that may result in increased bank erosion and loss of habitat. In-channel excavation of pools would take place in summer after June 15 – after the need for spawning habitat has passed. Subsequent winter flows may re-fill the pool before it can be used by fish in the following season.

- C. Grade Slope of Excavated Bar to Prevent Fish Entrapment. Excavation on bars by gravel skimming would have a 2% slope toward the bank. After extraction, gravel bars must be left void of isolated pockets or holes.
- D. Extract Gravel from the Downstream Portion of the Bar. Retaining the upstream one to two thirds of the bar and riparian vegetation while excavating from the downstream third of the bar is accepted as a method to promote channel stability and protect the narrow width of the low flow channel necessary for fish. Gravel would be redeposited in the excavated downstream one to two thirds of the bar (or downstream of the widest point of the bar) where an eddy would form during sediment transporting

flows. In contrast, if excavation occurs on the entire bar after removing existing riparian vegetation, there is a greater potential for widening and braiding of the low flow channel.

- E. Concentrate Activities to Minimize Disturbance. In-channel extraction activities should be concentrated or localized to a few bars rather than spread out over many bars. This localization of extraction will minimize the area of disturbance of upstream and downstream effects. Skimming decreases habitat and species diversity - these effects should not be expanded over a large portion of the study area.
 - F. Maintain Flood Capacity. Flood capacity in the Garcia River should be maintained in areas where there are significant flood hazards to existing structures or infrastructure.
 - G. Minimize Activities That Release Fine Sediment to the River. No washing, crushing, screening, stockpiling, or plant operations should occur at or below the streams "average high water elevation," or the dominant discharge. In the Garcia River the elevation of the dominant discharge is near the top of bank. These and similar activities have the potential to release fine sediments into the stream, providing habitat conditions deleterious to salmonids. The Regional Water Board regulates fine sediment releases to the river from gravel processing through its waste discharge requirements. Gravel mining and processing applicants should notify the Regional Water Board if waste discharge requirements are applicable to their operation.
 - H. Avoid Dry Road Crossings. Dry road crossings disrupt the substrate and can result in direct mortality or increased predation opportunity on fry. The crossing of choice and the one utilized in recent years in the lower Garcia is the free-span seasonal bridge. This type of crossing protects the upstream habitat as well as improving river conditions for recreation. If dry crossings are unavoidable, they should not be placed in the channel prior to June 15, and should be removed by October 15 so that they do not interfere with incubating or migrating salmonids. The number of crossings should be kept to a minimum. Placement of crossings should also take into account the damage which might occur to riparian vegetation. Roads should lead directly to the crossings and not long distances through the riparian corridor. Placement of any road crossing should be done with the approval of the Data Evaluation Team. Any structure placed across a river or recreationally navigable stream should be designed and installed so as to provide sufficient overhead clearance to allow unobstructed and safe passage for small recreational craft.
 - I. Limit In-channel Operations to the Period Between June 15 and October 15. Gravel extraction for outside this window may interfere with salmonid incubation and migration. The hatching period for late steelhead spawners may extend for 40-50 days. Therefore, the June 15 start date is necessary to protect eggs laid from late April to May. Spawning salmonids have been observed in the Garcia River system as late as June 2.
 - J. Avoid Expansion of Instream Mining Activities Upstream of River Mile 3.7. The reach of channel upstream of River Mile 3.7 is important to steelhead spawning. Gravel mining increases the probability of additional fine sediments in spawning gravels. In order to maintain suitable spawning gravels of riffles in this reach, it is strongly recommended that gravel mining within this reach be restricted to the site of present operations.
2. Floodplain (Off-Channel) gravel mining shall follow the following recommendations from the Garcia River Gravel Management Plan, prepared for the Mendocino County Water Agency, August 1996.
- A. Floodplain Gravel Extraction Should Be Set Back from the Main Channel. In a dynamic alluvial system, it is not uncommon for meanders to migrate across a floodplain. In areas where gravel extraction occurs on floodplains or terraces, there is a potential for the river channel to migrate toward the pit. If the river erodes through the area left between the excavated pit and the river, there is a potential for "river capture," a situation where the low flow channel is diverted through the pit. In the Garcia River, a setback of at least 400 feet is recommended to minimize the potential for river capture. In order to avoid river capture, excavation pits should set back from the river to provide a buffer and should be designed to withstand the 100-year flood. Adequate buffer widths and reduced pit slope gradients are preferred over engineered structures which require maintenance in perpetuity.

Hydraulic, geomorphic and geotechnical studies should be conducted prior to design and construction of the pit and levee.

In addition to river capture, extraction pits create the possibility of stranding fish. To avoid this impact, California Department of Fish and Game (CDFG) requires that all off-channel mining be conducted above the 25-year floodplain.

- B. The Maximum Depth of Floodplain Gravel Extraction Should Remain above the Channel Thalweg. Floodplain gravel pits should not be excavated below the elevation of the thalweg in the adjacent channel. This will minimize the impacts of potential river capture by limiting the potential for headcutting and the potential of the pit to trap sediment. A shallow excavation (above the water table) would provide a depression that would fill with water part of the year, and develop seasonal wetland habitat. An excavation below the water table would provide deep water habitat.
- C. Side Slopes of Floodplain Excavation Should Range from 3:1 to 10:1. Side slopes of a floodplain pit should be graded to a slope that ranges from 3:1 to 10:1. This will allow for a range of vegetation from wetland to upland. Steep side slopes excavated in floodplain pits on other systems have not been successfully reclaimed, since it is difficult for vegetation to become established. Terrace pits should be designed with a large percentage of edge habitat with a low gradient which will naturally sustain vegetation at a variety of water levels. Pit margins should be reclaimed with riparian buffer zones of fifty feet surrounding them. Islands should be incorporated into the reclaimed pits as waterfowl refugia. Pits should be designed with input from the Mosquito Abatement District.
- D. Place Stockpiled Topsoil above the 25-year Floodplain. Stockpiled topsoil can introduce a large supply of fines to the river during a flood event and degrade salmonid habitat. The CDFG considers storage above the 25-year flood inundation level sufficient to minimize this risk.
- E. Floodplain Pits Should Be Restored to Wetland Habitat or Reclaimed for Agriculture. There are very few examples of successfully restored or reclaimed gravel extraction pits on other river systems with gravel extraction. The key to overcoming barriers to successful restoration or reclamation is to conserve or import adequate material to re-fill the pit, while ensuring that pit margins are graded to allow for development of significant wetland and emergent vegetation.

Review of Individual Land Management Projects

Proposed land management projects that require Regional Water Board review for possible issuance of waste discharge requirements pursuant to Section 13260 of the California Porter-Cologne Water Quality Control Act, Clean Water Act Section 404 permits, and/or Clean Water Act Section 401 certification shall comply with this Action Plan, including TMDL, Implementation Plan and Monitoring Plan, as appropriate.

Restoration Projects

Landowners, agencies, and interested groups are encouraged to continue their interest, participation, and cooperation with restoration activities in the Garcia River watershed. Restoration is a tool useful for both stabilizing eroding stream banks throughout the watershed and improving instream habitat conditions. To ensure that stream restoration projects are planned and implemented in a manner that allows compliance with the provisions of the Action Plan, each landowner conducting restoration projects on his/her ownership shall notify the Regional Water Board in writing of any stream restoration activity, its location, the time frame of the project, and a summary of the work proposed. Landowners may propose to conduct restoration work in lieu of controlling a Sediment Delivery Site. The Executive Officer may consider allowing such a substitute in those cases where a greater environmental benefit would result.

Implementation Schedule

This Action Plan, including TMDL, Implementation Plan, and Monitoring Plan will take effect on January 3, 2002, in order to give landowners in the watershed the opportunity to implement voluntary actions.

Regional Water Board staff will send a letter to each landowner in the Garcia River watershed requesting a Statement of Intent regarding this Action Plan. The Regional Water Board letter will describe the options available to the landowner, which are as follows:

Option 1. Comply with the waste discharge prohibitions that apply to the Garcia River watershed.

Option 2. Comply with an approved Erosion Control Plan and a Site-Specific Management Plan.

Option 3. Comply with an approved Erosion Control Plan and the Garcia River Management Plan.

Landowners must comply with this Action Plan, including TMDL, Implementation Plan and Monitoring Plan through one of these three options or face potential permitting and/or enforcement action in the event of discharges of sediment. Landowners who do not submit a Statement of Intent are subject to the waste discharge prohibitions (Option 1).

Regional Water Board staff will review and respond to each Statement of Intent. The Board will then prioritize efforts in the Garcia River watershed, based on its general estimates of relative threat to water quality. Highest priority will be assigned on an ownership by ownership basis to those sites identified as having the highest existing discharge or potential discharge of sediment to a watercourse that supports fisheries.

Landowners who intend to follow either Option 2 or Option 3 are encouraged to do so as soon as possible and to submit their plans to the Regional Water Board. Regional Water Board staff will acknowledge receipt of each plan submitted and will review each plan for completeness. The Executive Officer will approve the plans if the review indicates that the plans meet the requirements specified above and complies with the schedule contained in Table 4-5, below. The Executive Officer will notify the landowner of his/her approval in a letter. Prior to approving an Erosion Control Plan or Site-Specific Management Plan, the Executive Officer will provide notice and an opportunity to comment to those who have requested it. At the Executive Officer's discretion, a Regional Water Board workshop may be scheduled to receive comments. Time extensions and minor revisions to approved Erosion Control Plans and Site-Specific Management Plans may be approved by the Executive Officer without notice.

**Table 4-5 Schedule for Reducing Sediment Delivery
from Land Management Activities in the Garcia River Watershed**

<u>SOURCE AND LAND USE</u>	<u>FINAL COMPLIANCE DATE</u>	<u>ACTIVITY AND INTERIM SCHEDULE¹</u>
Roads, landings, skid trails, timber harvest operations, agricultural operations, gravel mining, and other significant human-caused earth movement	January 3, 2005, and every 10 years thereafter, as necessary if new Sediment Delivery Sites are identified	Prepare an ownership-wide Baseline Data Inventory of controllable Sediment Delivery Sites and a Sediment Reduction Schedule for the reduction of sediment from the inventoried sites. No interim schedule.
Unstable Areas	January 3, 2005, and every 10 years thereafter, as necessary if new Unstable Areas are identified	Prepare an ownership-wide Assessment of Unstable Areas. No interim schedule.
Sediment Delivery Sites associated with Roads	January 3, 2015	Following the completion of the Baseline Data Inventory, control, in order of priority, all controllable Sediment Delivery Sites identified in the Baseline Data Inventory in such a manner as to reduce the sediment from sites representing 10 percent of the overall volume of inventoried sediment every year, or until 100 percent of the sites are controlled, whichever occurs first. Control measures are predicted to be 90 percent effective at reducing sediment delivery.

<u>SOURCE AND LAND USE</u>	<u>FINAL COMPLIANCE DATE</u>	<u>ACTIVITY AND INTERIM SCHEDULE¹</u>
Sediment Delivery Sites associated with Timber Harvest Operations, including skid trails and landings	January 3, 2015	Following the completion of the Baseline Data Inventory, control, in order of priority, all controllable Sediment Delivery Sites identified in the Baseline Data Inventory in such a manner as to reduce the sediment from sites representing 10 percent of the overall volume of inventoried sediment every year, or until 100 percent of the sites are controlled, whichever occurs first. Control measures are predicted to be 90 percent effective at reducing sediment delivery.
Sediment Delivery Sites associated with agricultural operations in the Riparian Management Zone	January 3, 2025	Following the completion of the Baseline Data Inventory, control, in order of priority, all controllable Sediment Delivery Sites in the Riparian Management Zone in such a manner as to reduce the sediment from sites representing 20 percent of the overall volume of inventoried sediment every four years, or until 100 percent of the sites have been controlled, whichever occurs first. Control measures in the Riparian Management Zone are predicted to be 90 percent effective at reducing sediment delivery.
Sediment Delivery Sites associated with agricultural operations on the hillslopes	January 3, 2025	Following the completion of the Baseline Data Inventory, control, in order of priority, all controllable Sediment Delivery Sites on hillslopes in such a manner as to reduce the overall volume of inventoried sediment by 20 percent every four years, or until a 100 percent of the sites have been controlled, whichever occurs first. Control measures on the hillslopes are predicted to be 50 percent effective at reducing sediment delivery.
Activities on Unstable Areas and in Riparian Management Zones, and activities related to roads, watercourse crossings, near stream facilities, and gravel mining	See the Garcia River Management Plan or the approved Site-Specific Management Plan	Implement Land Management Measures contained in an approved Site-Specific Management Plan or the Garcia River Management Plan in accordance with the schedule contained therein.
Annual Report	January 30, 2004 and each January 30th thereafter	Report to the Regional Water Board all erosion control-related activities and sedimentation reduction results of the previous year.

¹ Compliance with the interim schedules for the control of Sediment Delivery Sites will be calculated by dividing the volume of sediment controlled during each one year or four year period by the overall volume of inventoried sediment associated with that category of source or land use.

VII. Monitoring Plan

Monitoring is intended to provide information regarding the effectiveness of sediment control efforts in attaining the Numeric Targets over time. Instream and hillslope monitoring parameters, monitoring protocols, and frequency of monitoring are described in Table 4-6. Instream and hillslope monitoring by landowners (except for the Sediment Delivery Site monitoring described in the Erosion Control Plan, above) is on a voluntary basis. Regional Water Board staff will coordinate instream monitoring efforts of the landowners, other regulatory agencies, academic institutions, and members of the public and shall set a goal of establishing at least one instream monitoring point in each of the twelve Planning watersheds in the Garcia River watershed. In addition, Regional Water Board staff will work together with the University of California Cooperative Extension to assist landowners in developing voluntary monitoring plans.

Landowners choosing Option 2 or Option 3 should assess the landscape associated with their property to determine which of the listed instream and hillslope monitoring parameters are most appropriately measured and are encouraged to submit their plans for voluntary monitoring to the Regional Water Board for comment prior to implementing them. Landowners are strongly encouraged to conduct voluntary instream and hillslope

monitoring as a means of improving the scientific understanding of the Garcia River watershed and to provide a site specific basis for revising the Action Plan over time. Landowners are particularly encouraged to establish instream monitoring points above and below any significant land management activity on their properties and in potential anadromous fish refugia.

Landowners are required to submit by January 30 of each year an annual report describing the erosion control-related activities of the previous year and the sediment delivery reduction results of those activities, including source reduction volumes. In addition, landowners are encouraged to disclose in the annual reports the results of any voluntary instream and hillslope monitoring. At least annually, Regional Water Board staff will compile and evaluate the results of the annual reports provided by landowners for review by the Regional Water Board to assess the progress of the Action Plan. In the event that sufficient information to assess the progress of the Action Plan is not gained through the voluntary monitoring efforts of landowners and others as augmented by the Regional Water Board, revisions to the monitoring provisions of the Action Plan, through a Basin Plan amendment, will be contemplated.

Table 4-6 Summary of Monitoring Parameters and Protocols

<u>PARAMETER</u>	<u>PROTOCOL</u>	<u>BRIEF DESCRIPTION</u> (Protocol should be consulted for detailed methodology)	<u>FREQUENCY</u>
INSTREAM MONITORING			
Sediment-related barriers	Any defensible method	Stream survey; identification of sediment deltas, underground stream sections, shotgun culverts, reaches with water depths less than 0.18 meters, etc.; measurement or estimate of extent of barrier and mapping of location.	Annual
Embeddedness	Flosi and Reynolds (1994), Burns (1984)	Identify at least 5 riffle habitat units in Class I streams. Randomly select at least 50 cobbles from each habitat unit and measure or estimate the percent of each cobble which is covered or surrounded by fines. This will be obvious from a dark ring around the cobble indicating its exposure to stream flow. Rate each cobble 1, 2, 3, or 4 as follows: score of 1=cobbles 0-25% surrounded or covered by fines; 2=26-50%; 3=51-75%; 4=76-100%.	Annual
% fines, gravel composition	McNeil protocol, Valentine (1995)	Identify at least 5 riffle habitat units in Class I streams. Collect at least 2 bulk core samples of sediment in each habitat unit in the first at the pool/riffle break immediately downstream of pool crests. Measure the amount of volume of sediment associated with each size class in the field. Bag at least 5 samples to be weighed in the laboratory to establish a correlation between weight and volume.	Annual
Pool characteristics	Flosi and Reynolds (1994)	Identify at least 10 pool habitat units within a reach that is 20-30 bankfull widths long in Class I streams. Measure habitat unit length, characterize habitat types in each unit, and measure mean width of low flow channel. Measure maximum length, width and depth of all pools in each unit. Measure depth of each pool tail crest.	Annual
Frequency of primary pools	Flosi and Reynolds (1994)	Within each reach (as described above), identify the maximum length of all pools which are >3 feet deep, > in width then 1/2 width of low flow channel, and > in length then width of low flow channel.	Annual

<u>PARAMETER</u>	<u>PROTOCOL</u>	<u>BRIEF DESCRIPTION</u> (Protocol should be consulted for detailed methodology)	<u>FREQUENCY</u>
V*	Lisle and Hilton (1992), Knopp (1993)	Identify at least 10 survey units within a reach of 20-30 bankfull widths in length in 3rd order streams with slopes 1-4%. Measure the residual volume of each pool within the unit with a graduated rod along transects, as described by Lisle and Hilton.	Annual
D50	Knopp (1993), Rosgen (1996)	Identify at least 5 survey units within a reach of at least 20-30 bankfull channel widths long in 3rd order streams with slopes 1-4%. Lay out transects, as described by Rosgen, and collect at least 100 particles in each reach. Measure the particle, as described, and tally for later graphing.	Annual
Volume of large woody debris	Shuett-Hames (1994) for Timber, Fish and Wildlife Watershed Assessment Manual (Level 2 analysis)	Identify at least 10 survey units of at least 500 feet long within Class I, II and III streams. Identify and measure all pieces of large woody debris, including logs at least 4 inches in diameter and 72 inches long, and root wads. Note the location of the LWD in the channel, the channel length, wood type, stabilizing factors, pool formation function and orientation and decay class.	At least once every three years
Cross-section	Rosgen (1996)	Identify at least 1 survey unit within a reach of 20-30 bankfull widths long in each Class I and II streams. Establish at least 3 transects across the bankfull channel in each survey unit and collect evenly spaced measurements of the depth to channel along each transect. The transect should be marked for return at subsequent samplings.	At least once every three years
Thalweg profile	Dunne and Leopold (1976)	Identify at least 1 survey unit within a reach of at least 20-30 bankfull widths long in each Class I and II streams. Survey units must be no less than 30 times the bankfull channel width with 3-4 meanders within the survey unit.	At least once every three years
Miles of open stream channel	Grant (1988)	Modified RAPID analysis measuring linear distance of open stream channels from aerial photographs.	At least once every ten years
Flow and/or stage height	Gordon, et. al. (1992)	Measurements or estimates determined during instream sampling. Continuous measurements are desirable but require sophisticated equipment that is vulnerable to damage. Point measurements of stage height during storm event and routinely through the year are more manageable.	Ongoing
Rainfall		Daily measurement using a gage with a sensitivity of 0.1 inch.	Ongoing
HILLSLOPE MONITORING			
Landslides, fluvial, and surface erosion associated with roads, landings and skid trails	Pacific Watershed Associates or similar method	Road inventory; identification of existing and potential sediment delivery sites; measurement or estimation of volume of sediment associated with each site.	Annual

<u>PARAMETER</u>	<u>PROTOCOL</u>	<u>BRIEF DESCRIPTION</u> (Protocol should be consulted for detailed methodology)	<u>FREQUENCY</u>
Landslides associated with harvest units	Timber, Fish and Wildlife (Washington State)	Aerial photographs; identification of landslide features associated with timber harvest units; measurement of the area of the landslide feature; estimate of the volume of sediment delivered to the stream from each feature.	Annual
Landslides, fluvial, and surface erosion associated with agricultural activities	Any defensible method	Property survey; identification of existing and potential erosion problems; measurement or estimation of volume of sediment associated with each site or situation.	Annual
Stream crossing failures	Pacific Watershed Associates or similar method	Road survey after storms with a 20 year recurrence interval or greater; identify location of failed or partially failed crossings; measurement or estimation of volume of sediment associated with failure.	Once in summer of years having storms with a 20 year recurrence interval, or greater
Density of unpaved roads	Any defensible method	GIS and/or THP data review; cumulative tally of miles of road per tributary or Planning Watershed, the average width of the road system, and the density of unpaved roads.	At least once every ten years

VIII. Estimated Total Cost and Potential Sources of Funding

An estimated cost to implement the sedimentation reduction efforts described in the Action Plan is \$5 million plus unquantified costs which include inventory costs and the opportunity cost of the volume of unharvested timber, up to an additional \$2 million. Potential training and financing resources available to landowners include but are not limited to the Wildlife Habitat Incentive Program (WHIP), the Environmental Quality Incentives Program (EQUIP), the Conservation Reserve Program (CRP), the Salmon and Steelhead Restoration Program (SSRP), the Forestry Incentive Program (FIP), the Salmon and Steelhead Restoration Account (SSRA), and Clean Water Act Section 205(j) and Section 319(h) funding.

IX. Plan for Future Review of the Strategy

Public participation was a key element in the development of the Strategy and will continue to be an essential component in its implementation. Interested persons will have the opportunity to comment on the progress of the Action Plan at watershed meetings, and to the Regional Water Board at least once every 3 years, at which time the Regional Water Board shall determine if there is sufficient progress toward implementation of erosion control and management activities, as well as movement towards attainment of the Numeric Targets described in the Action Plan. If sufficient progress as described above is not documented, the Regional Water Board will consider revising the Action Plan through a Basin Plan amendment. If the Regional Water Board concludes that the Numeric Targets are being attained throughout a Planning watershed, it may consider suspending or terminating some or all of the Action Plan for landowners within that Planning watershed.

4.2.9 Action Plan For The Scott River Sediment And Temperature Total Maximum Daily Loads²⁰

The Scott River watershed, (CalWater Hydrologic Area 105.40), comprises approximately 520,184 acres (813

²⁰ Adopted by the North Coast Regional Water Quality Control Board on December 7, 2005. Adopted by the State Water Resources Control Board on June 21, 2006. Approved by the State Office of Administrative Law on August 11, 2006. Approved by the United States Environmental Protection Agency on September 8, 2006.

mi²) in Siskiyou County. The Scott River is tributary to the Klamath River.

The *Action Plan for the Scott River Sediment and Temperature Total Maximum Daily Loads*, hereinafter known as the Scott River TMDL Action Plan, includes sediment and temperature total maximum daily loads (TMDLs) and describes the implementation actions necessary to achieve the TMDLs and attain water quality standards in the Scott River watershed within 40 years of United States Environmental Protection Agency approval of the Scott River TMDL Action Plan.

The goal of the Scott River TMDL Action Plan is to achieve the TMDLs, and thereby achieve sediment and temperature related water quality standards, including the protection of the beneficial uses of water in the Scott River watershed.

The Scott River TMDL Action Plan sets out the loads and directs conditions to be considered and incorporated into regulatory and non-regulatory actions in the Scott River watershed. The Scott River TMDL Action Plan is not directly and independently enforceable, except as incorporated into appropriate permitting or enforcement orders.

A glossary defining key terms is located on page 4-68.00.

I. Problem Statement

Excessive sediment loads and elevated water temperatures in the Scott River and its tributaries have resulted in degraded water quality conditions that impair designated beneficial uses, including contact (REC-1) and non-contact water recreation (REC-2); commercial and sport fishing (COMM); cold freshwater habitat (COLD); rare, threatened, and endangered species (RARE); migration of aquatic organisms (MIGR); and spawning, reproduction, and/or early development of fish (SPWN). Excessive sediment loads have resulted in the non-attainment of water quality objectives for sediment, suspended material, and settleable material. Elevated water temperatures have resulted in the non-attainment of the water quality objective for temperature. Excessive sediment loads and elevated water temperatures have adversely affected the beneficial uses associated with the cold water salmonid fishery. The Scott River watershed has been listed as impaired with relation to sediment since 1992, and impaired with relation to temperature since 1998, pursuant to Section 303(d) of the Clean Water Act.

II. Watershed Restoration Efforts

Throughout the Scott River watershed, many individuals, groups, and agencies have been working to enhance and restore fish habitat and water quality. These groups include, but are not limited to, the Siskiyou Resource Conservation District, the Scott River Watershed Council, the French Creek Watershed Advisory Group, private timber companies, Siskiyou County and the Five Counties Salmon Conservation Process, the California Department of Fish and Game, the California Department of Water Resources, the United States Forest Service, and the Klamath River Basin Fisheries Task Force. The past and present proactive efforts of these stakeholders have improved, and will continue to improve, water quality conditions in the Scott River and its tributaries.

III. Sediment

A. Scott River Sediment Source Analysis

The sediment source analysis identifies the various sediment delivery processes and sources in the Scott River watershed and estimates delivery from these sources. The results of the sediment source analysis are located in Table 4-7.

B. Scott River Sediment TMDL

The sediment TMDL for the Scott River watershed is 550 tons of sediment per square mile per year. The sediment TMDL is the estimate of the total amount of sediment, from both natural and anthropogenic sources, that can be delivered to a water body without causing non-attainment of

applicable water quality standards. The TMDL is to be evaluated as a ten-year, rolling-average of the annual sediment yield.

C. Scott River Sediment Load Allocations

In accordance with the Clean Water Act, the Scott River sediment TMDL is allocated to the sources of sediment in the watershed. The load allocations are located in Table 4-8.

The load allocations are expressed as averages over the entire Scott River watershed and are to be evaluated on a ten-year, rolling-average basis. Each square mile is not expected to meet the load allocations within a particular source category. Rather, it is expected that the average for the entire source category will meet the load allocation for that category.

D. Scott River Sediment Margin of Safety

The TMDL includes an implicit margin of safety, based on conservative assumptions, to account for uncertainties in the analysis. The conservative assumptions include (1) underestimating sediment delivery from natural soil creep because available information did not indicate all streams; and (2) underestimating the age of small streamside sediment sources, which results in higher annual rates of sediment delivery from these sources.

E. Scott River Sediment Seasonal Variations & Critical Conditions

To account for annual and seasonal variability in sediment delivery events, sediment delivery mechanisms, and storm patterns in the Scott River watershed, the TMDL and load allocations apply to sources of sediment, not the movement of sediment across the landscape.

To account for critical conditions in stream flow, sediment loading, and water quality, the TMDL uses instream salmonid habitat parameters with desired conditions to reflect net long term effects of sediment loading and transport.

IV. Temperature

A. Scott River Temperature Source Analysis

The temperature source analysis identifies the various water heating and cooling processes and sources of elevated water temperatures in the Scott River watershed. Anthropogenic processes that influence water temperature include changes to: stream shade, stream flow via changes in groundwater accretion, stream flow via surface water use, microclimate, and channel geometry.

The primary factor affecting stream temperatures in the Scott River watershed is increased solar radiation resulting from reductions of shade provided by near-stream vegetation. Changes in groundwater accretion also impact water temperatures in Scott Valley. Diversions of surface water lead to relatively small temperature impacts in the mainstem Scott River, but have the potential to affect temperatures in smaller tributaries where the volume of water diverted is relatively large compared to the total stream flow. Microclimate alterations resulting from near-stream vegetation removal increase temperatures, where microclimates exist. Changes in channel geometry from natural conditions also negatively affect water temperatures.

B. Scott River Temperature TMDL

The temperature TMDL is focused on effective shade and adjusted potential effective shade (see the Glossary for definitions). The temperature TMDL for the Scott River watershed is the adjusted potential effective shade conditions for the date of the summer solstice as expressed graphically in Figure 4-4 and numerically in Table 4-9 that can occur along a water body without causing non-attainment of applicable water quality standards.

Figure 4-4 shows the percent of stream length in the watershed that is shadier than a given shade value. For example, approximately 30% of the stream length has an effective shade index value of 5.00 or more under current conditions, whereas approximately 74% of the stream length would have an effective shade index value of 5.00 or more under adjusted potential shade conditions. An effective shade index value of 5.00 is equivalent to 50% effective shade.

As more information becomes available, the temperature TMDL may require revision.

C. Scott River Temperature Load Allocations

The Scott River temperature load allocations are adjusted potential effective shade conditions as expressed in Figure 4-5.

D. Scott River Temperature Margin of Safety

The TMDL includes an implicit margin of safety, based on conservative assumptions, to account for uncertainties in the analysis. The conservative assumptions include not accounting for improvements in stream temperatures that are likely to result from reductions in sediment inputs and increases in large woody debris. The resulting water temperature improvements were not accounted for in the analysis and provide a margin of safety.

E. Scott River Temperature Seasonal Variations & Critical Conditions

To account for annual and seasonal variability, the analysis evaluated temperatures and thermal processes during the most critical time period for the most sensitive beneficial use (i.e., the hottest time of the year).

V. Implementation

Table 4-10 describes the specific implementation actions that shall be taken to achieve the TMDLs and meet the sediment and temperature-related water quality standards in the Scott River watershed. Table 4-10 is organized by topic or source and by responsible party. Individual landowners and responsible parties may find that more than one implementation action is applicable to their unique circumstances.

The implementation actions are designed to encourage and build upon on-going, proactive restoration and enhancement efforts in the watershed. Additionally, the implementation actions described in Table 4-10 are necessary to fulfill obligations of the NPS Policy²¹ and the Sediment TMDL Implementation Policy.²²

Although the Regional Water Board prefers to pursue the implementation actions described in Table 4-10, the Regional Water Board shall take appropriate permitting and/or enforcement actions should any of the implementation actions fail to be implemented by the responsible party or should the implementation actions prove to be inadequate. Various permitting and enforcement actions are described in the permitting and enforcement tools section on pages 4-36.00 through 4-37.00.

VI. Monitoring

Monitoring shall be conducted upon the request of the Regional Water Board's Executive Officer in conjunction with existing and/or proposed human activities that will result or likely result in sediment waste discharges and/or elevated water temperatures within the Scott River watershed. Monitoring shall involve one or more of the following: implementation monitoring, upslope effectiveness monitoring, instream effectiveness monitoring, and compliance and trend monitoring. See the Glossary for definitions of these terms.

In order to determine the effectiveness of the Scott River TMDL Action Plan, Regional Water Board staff shall develop a compliance and trend monitoring plan. The plan should include a description of monitoring objectives, parameters to monitor, procedures and techniques, locations of monitoring stations, frequency

²¹ The *Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program* (NPS Policy).

²² The *Total Maximum Daily Load Implementation Policy Statement for Sediment-Impaired Waters in the North Coast Region* (Sediment TMDL Implementation Policy).

and duration, quality control and quality assurance protocols, data management procedures, data and analysis distribution procedures, benchmark conditions where available, measurable milestones, and specific due dates for monitoring and data analysis. Regional Water Board staff shall complete the monitoring plan by September 8, 2007.

Monitoring requirements, primarily implementation monitoring and upslope effectiveness monitoring, are specifically incorporated into the proposed Memoranda of Understanding with the County of Siskiyou, the USFS, and the BLM. Additionally, implementation and upslope effectiveness monitoring will likely be required of those landowners/dischargers required to develop and implement an Erosion Control Plan and/or a Grazing and Riparian Management Plan, as necessary and appropriate on a case-by-case basis.

VII. Reassessment and Adaptive Management

The Regional Water Board will review, reassess, and possibly revise the Scott River TMDL Action Plan. Reassessment is likely to occur every three years during the Basin Planning Triennial Review process. Regional Water Board staff will report to the Regional Water Board at least yearly on the status and progress of implementation activities, and on whether current efforts are reasonably calculated and on track to achieve water quality standards within forty years. For activities that rely on encouragement as a first step, a formal assessment of effectiveness of these efforts will be completed by September 8, 2011. A more extensive reassessment will occur after September 8, 2016, the date that is ten years after the TMDL Action Plan took effect, or sooner, if the Regional Water Board determines it necessary. During reassessment, the Regional Water Board is likely to consider how effective the requirements of the TMDL Action Plan are at meeting the TMDLs, achieving sediment and temperature water quality objectives, and protecting the beneficial uses of water in the Scott River watershed.

VIII. Enforcement

The Regional Water Board shall take enforcement actions for violations of the Scott River TMDL Action Plan where elements of the TMDL Action Plan are made enforceable restrictions in a specific permit or order, as appropriate. Nothing in this TMDL Action Plan precludes actions to enforce any directly applicable prohibition found elsewhere in the Basin Plan or to require cleanup and abatement of existing sources of pollution where appropriate.

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Subwatershed ²	Natural Sources					Anthropogenic Sources					Total Volume of Sediment Sources
	Landslides ³	Large Discrete Streamside Features ⁴	Small Discrete Streamside Features ⁵	Streamside Soil Creep	Unique Landslide Features	Landslides ⁶	Large Discrete Streamside Features ⁴	Small Discrete Streamside Features ⁵	Road Related Sources ⁷	Unique Landslide Features	
West Canyon	111	104	295	33	0	132	84	166	105	0	1031
East Canyon	0	87	387	37	0	1	31	180	31	0	754
Eastside	0	88	367	36	0	0	39	168	10	0	709
East Headwaters	0	108	236	33	0	1	124	175	13	0	691
West Headwaters	8	149	276	29	140	35	105	166	29	9	945
Westside	45	117	330	31	0	12	52	176	29	0	786
Scott Valley	0	0	226	13	0	0	0	287	6	0	533
Scott River Watershed	23	85	302	29	8	21	55	195	29	0	747

1. Minor addition errors caused by rounding differences.
2. Each subwatershed is delineated in Figure 4-3.
3. Includes landslides visible on air photos generally greater than one acre in size.
4. Large Discrete Features: Generally long-term continuing sources of sediment that typically originate on, or extend up onto, the mountainside based on on-site streamside surveys.
5. Small Discrete Features: Stream bank failures, gullies, and other small failures that mostly deliver episodically to a water body based on on-site streamside surveys.
6. Includes landslides visible on air photos generally greater than one acre in size. Excludes road-related landslides.
7. Includes road-related stream crossing failures, gullies, fill failures, and landslides based on road inventories. Includes road-related surface erosion and cut bank failures based on modeling.

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Table 4-8 Scott River Sediment Load Allocations ¹						
Sediment Source		Current Load (tons/sq. mi. - yr)		Reduction Needed	Load Allocations (tons/sq. mi. - yr)	
Natural	Landslides ²	23	448	0%	23	448
	Large Discrete Streamside Features	93		0%	93	
	Small Discrete Streamside Features	302		0%	302	
	Streamside Soil Creep	29		0%	29	
Anthropogenic	Road Surface Erosion	4	299	54%	2	112
	Road-Related Stream Crossing Failures	3		71%	1	
	Road-Related Gullies	1		31%	1	
	Road-Related Cut/Fill Failures	4		76%	1	
	Road-Related Landslides ²	16		56%	7	
	Landslides, Timber Harvest Related	19		52%	9	
	Landslides, Mining Related ²	2		0%	2	
	Large Discrete Streamside Features ³	55		69%	17	
	Small Discrete Streamside Features, Harvest Related	54		63%	20	
	Small Discrete Streamside Features, Mining Related	2		0%	2	
Small Discrete Streamside Features, Other ³	139	64%	50			
Totals		747		63%	560	

1. Minor addition errors caused by rounding differences.
2. Includes both "Landslides" and "Unique Landslide Features" from Table 4-7.
3. Sources influenced or caused by multiple interacting human activities not inventoried by other methods.

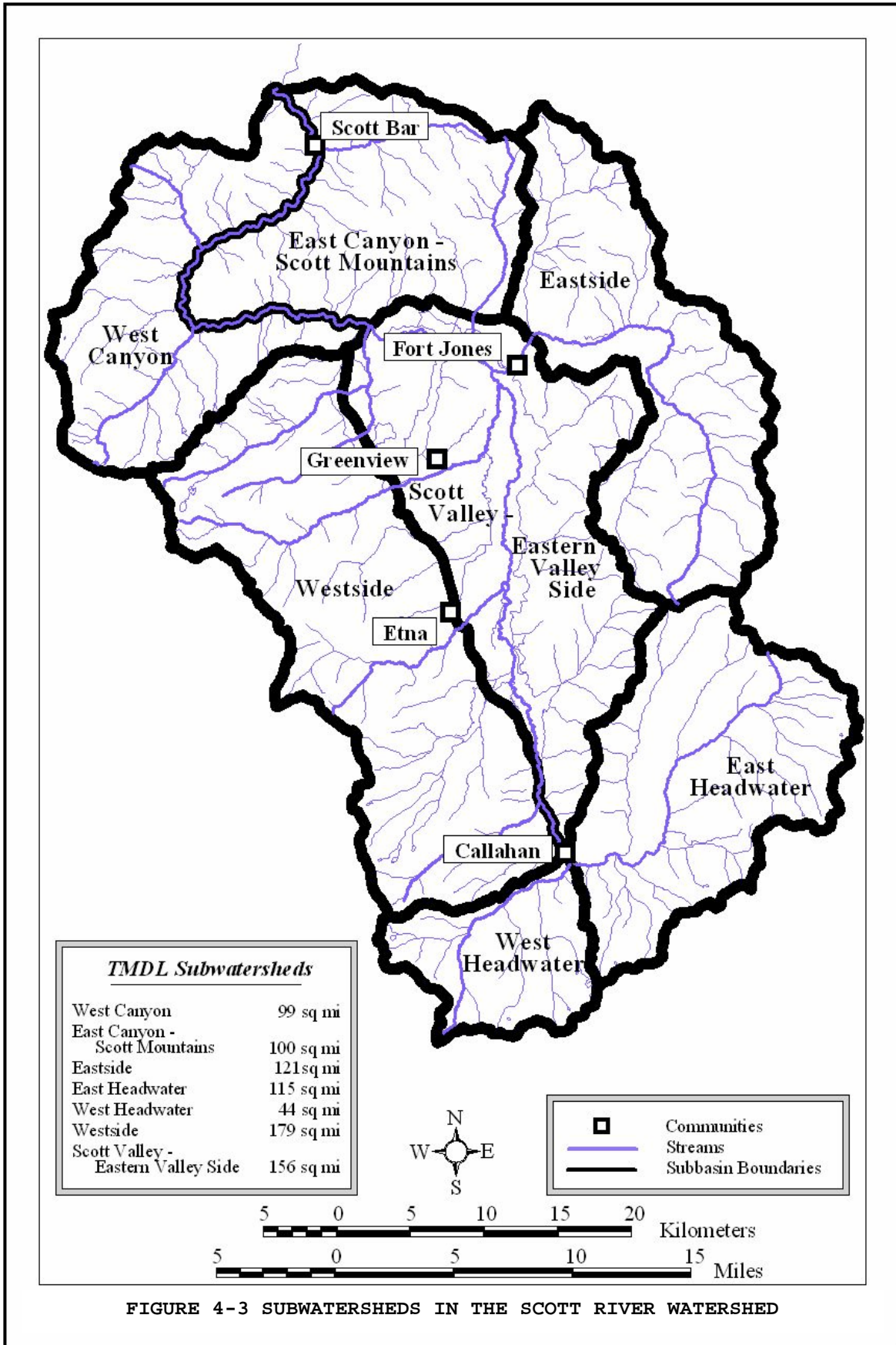


FIGURE 4-3 SUBWATERSHEDS IN THE SCOTT RIVER WATERSHED

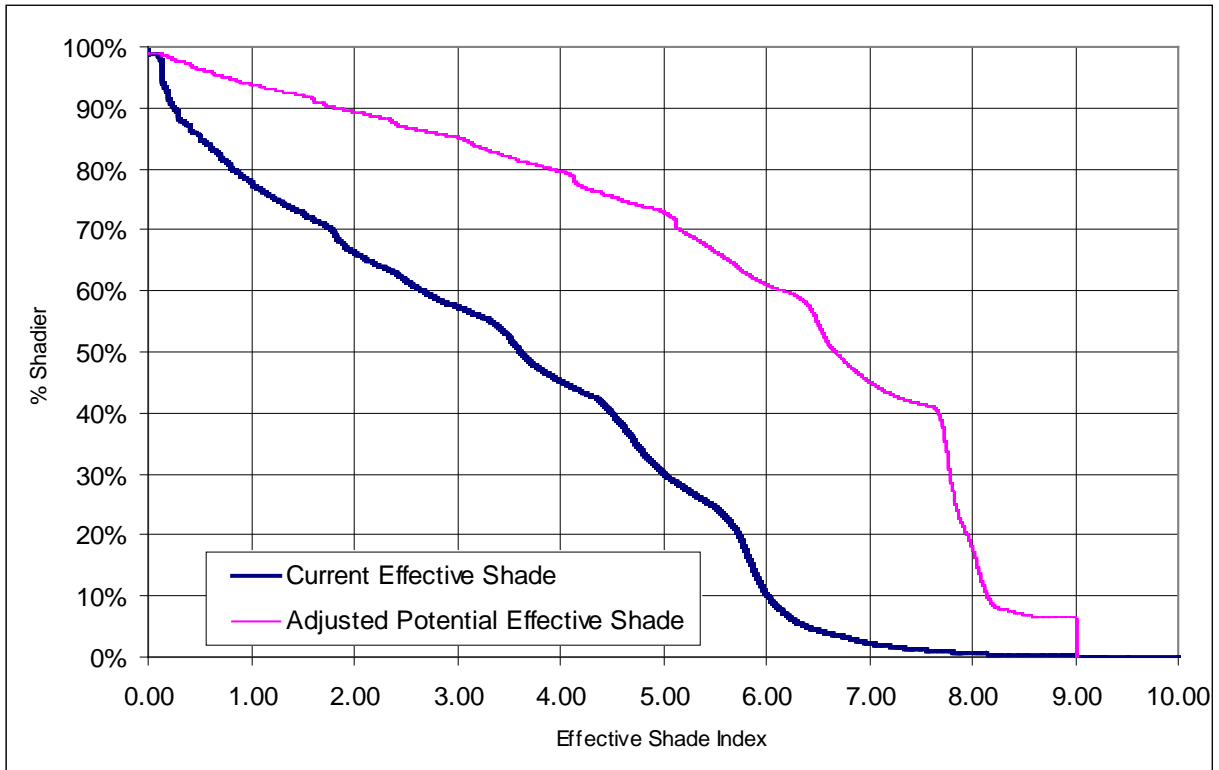


FIGURE 4-4 SCOTT RIVER TEMPERATURE TMDL EXPRESSED GRAPHICALLY
 (“% Shadier” refers to the percentage of stream length with more shade than the corresponding effective shade index.)

Table 4-9 Scott River Temperature TMDL Expressed Numerically

Shade Class	Stream Length - Current Vegetation Conditions				Stream Length - Potential Vegetation Conditions			
	(miles)	(km)	% Shadier	% of Total	(miles)	(km)	% Shadier	% of Total
0-1	141	227	77.9%	22.1%	33	53	94.8%	22.1%
>1-2	73	117	66.6%	11.3%	29	46	90.3%	4.5%
>2-3	57	91	57.7%	8.8%	26	43	86.2%	4.1%
>3-4	78	126	45.4%	12.3%	26	58	80.5%	5.7%
>4-5	97	157	30.2%	15.2%	43	69	73.9%	6.7%
>5-6	127	204	10.3%	19.9%	76	122	62.0%	11.9%
>6-7	52	83	2.3%	8.1%	103	165	45.9%	16.0%
>7-8	10	17	0.6%	1.6%	177	284	18.3%	27.6%
>8-9	3	5	0.2%	0.5%	116	186	0.2%	18.1%
>9-10	1	2	0.0%	0.2%	1	2	0.0%	0.2%
Total:	639	1028			639	1028		

(% Shadier refers to the percentage of stream length shadier than the upper bound of the corresponding shade class)

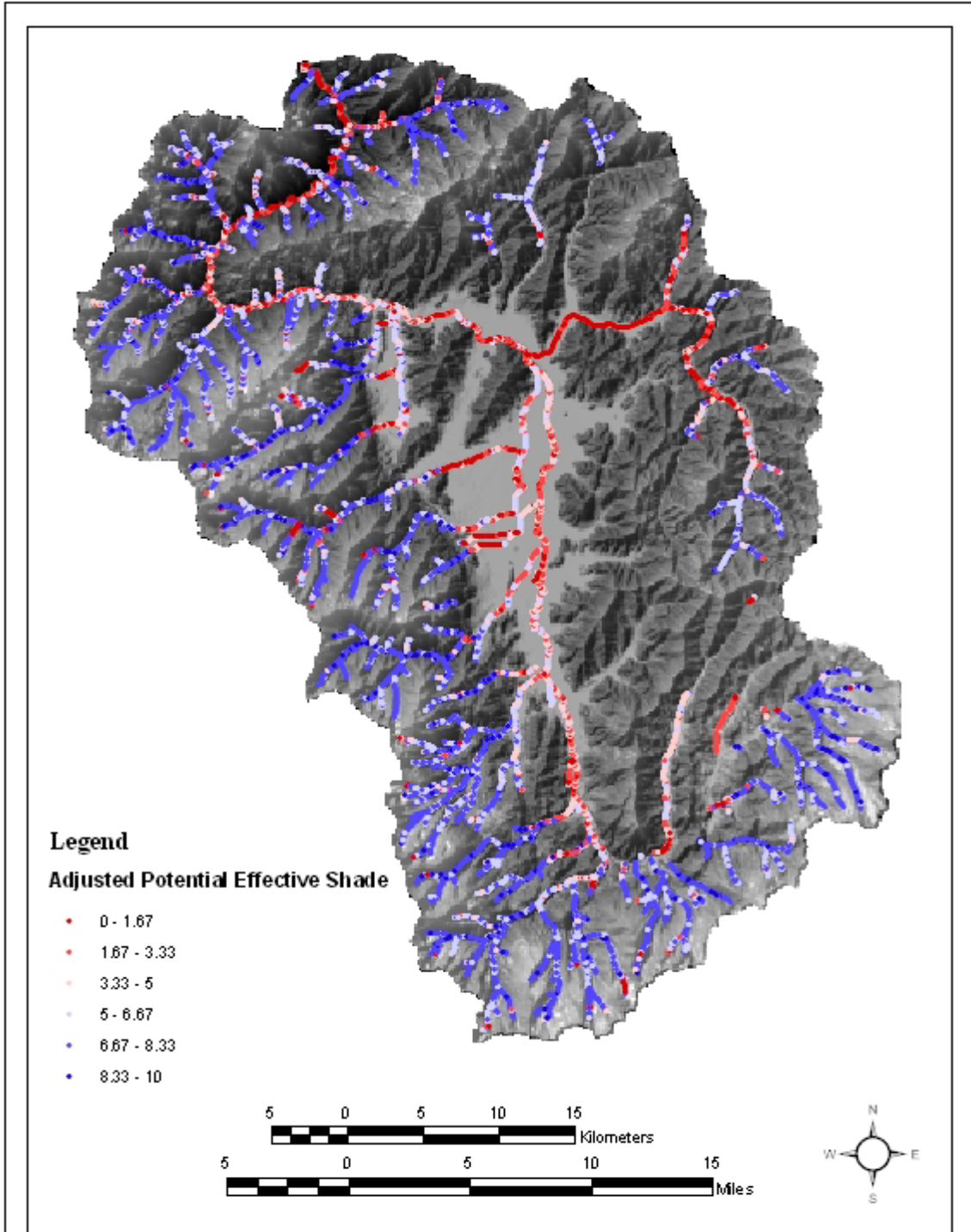


Figure 4.29: Adjusted Potential Effective Shade, Scott River Watershed

FIGURE 4-5 SCOTT RIVER TEMPERATURE LOAD ALLOCATIONS

CHAPTER 4. IMPLEMENTATION

Table 4-10 Scott River Sediment and Temperature TMDL Implementation Actions*

Topic	Responsible Parties	Actions
Roads & Sediment Waste Discharges	<ul style="list-style-type: none"> • Parties Responsible for Roads and Sediment Waste Discharge Sites. • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board encourages parties responsible for roads and sediment waste discharge sites to take actions necessary to prevent, minimize, and control road-caused sediment waste discharges. Such actions may include the inventory, prioritization, control, monitoring, and adaptive management of sediment waste discharge sites and proper road inspection and maintenance. • The Regional Water Board's Executive Officer shall require parties responsible for roads, on an as-needed, site-specific basis, to develop and submit an Erosion Control Plan and a Monitoring Plan. An Erosion Control Plan shall describe, in detail, sediment waste discharge sites and how and when those sites are to be controlled. By September 8, 2008, criteria shall be developed for determining when an Erosion Control Plan shall be required, although nothing precludes the Executive Officer from requiring Erosion Control Plans prior to this date. • Should discharges or threatened discharges of sediment waste that could negatively affect the quality of waters of the State be identified in an Erosion Control Plan or by other means, dischargers shall be required to implement their Erosion Control Plan and monitor sediment waste discharge sites through appropriate permitting or enforcement actions.
Roads	<ul style="list-style-type: none"> • California Department of Transportation (Caltrans). • Regional Water Board. 	<ul style="list-style-type: none"> • Regional Water Board staff shall evaluate the effects of Caltrans' state-wide NPDES permit, storm water permit, and waste discharge requirements (collectively known as the Caltrans Storm Water Program) by September 8, 2008. The evaluation shall determine the adequacy and effectiveness of the Caltrans Storm Water Program in preventing, reducing, and controlling sediment waste discharges and elevated water temperatures in the North Coast Region, including the Scott River watershed. If Regional Water Board staff find that the Caltrans Storm Water Program is not adequate and effective, Regional Water Board staff shall develop specific requirements, for State Water Board consideration, to be incorporated into the Caltrans Storm Water Program at the earliest opportunity, or the Regional Water Board shall take other appropriate permitting or enforcement actions.
Roads	<ul style="list-style-type: none"> • County of Siskiyou (County). • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board and the County shall work together to draft and finalize a Memorandum of Understanding (MOU) to address county roads in the Scott River watershed. The MOU shall be drafted and ready for consideration by the appropriate decision-making body(ies) of the County by September 8, 2008. The following items shall be addressed during MOU development: <ol style="list-style-type: none"> 1. A date for the initiation and completion of an inventory of all sediment waste discharge sites caused by county roads within the Scott River watershed, which can be done with assistance from the Five Counties Salmonid Conservation Program. 2. A date for the completion of a priority list of sediment waste discharge sites. 3. A date for the completion of a schedule for the repair and control of sediment waste discharge sites. 4. A date for the completion of a document describing the sediment control practices to be implemented by the County to repair and control sediment waste discharge sites, which can be done with assistance from the Five Counties Salmonid Conservation Program. 5. A description of the sediment control practices, maintenance practices, and other management measures to be implemented by the County to prevent future sediment waste discharges, which can be done with assistance from the Five Counties Salmonid Conservation Program. 6. A monitoring plan to ensure that the sediment control practices are implemented as proposed and effective at controlling discharges of sediment waste. 7. A commitment by the County to complete the inventory, develop the priority list, develop and implement the schedule, develop and implement sediment control practices, implement the monitoring plan, and conduct adaptive management.

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Table 4-10 Scott River Sediment and Temperature TMDL Implementation Actions*

Topic	Responsible Parties	Actions
Grading	<ul style="list-style-type: none"> • County of Siskiyou (County). • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board encourages the County to develop a comprehensive ordinance addressing roads, land disturbance activities, and grading activities outside of subdivisions in the Scott River watershed, or an equivalent County-enforceable mechanism, by September 8, 2008. The ordinance may be specific to the Scott River watershed or county-wide in scope.
Dredge Mining	<ul style="list-style-type: none"> • Regional Water Board. 	<ul style="list-style-type: none"> • Regional Water Board staff shall review laws and regulations that address water quality effects of suction dredge mining and shall investigate the impact of suction dredge mining activities on sediment and temperature loads in the Scott River watershed by September 8, 2009. If Regional Water Board staff find that dredge mining activities are discharging deleterious sediment waste and/or resulting in elevated water temperatures, staff shall propose, for Board consideration, the regulation of such discharges through appropriate permitting or enforcement actions.
Temperature & Vegetation	<ul style="list-style-type: none"> • Parties Responsible for Vegetation that Shades Water Bodies. • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board encourages parties responsible for vegetation that provides shade to a waterbody in the Scott River watershed to preserve and restore such vegetation. This may include planting riparian trees, minimizing the removal of vegetation that provides shade to a waterbody, and minimizing activities that might suppress the growth of new or existing vegetation (e.g., allowing cattle to eat and trample riparian vegetation). • To address compliance with the Nonpoint Source Policy, the Regional Water Board shall develop and take appropriate permitting and enforcement actions to address the human-caused removal and suppression of vegetation that provides shade to a water body in the Scott River watershed. The Regional Water Board's Executive Officer shall report to the Regional Water Board on the status of the preparation and development of appropriate permitting and enforcement actions by September 8, 2009.
Water Use	<ul style="list-style-type: none"> • Water Users. • County of Siskiyou (County). • Stakeholders • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board encourages water users to develop and implement water conservation practices. • The Regional Water Board requests the County, in cooperation with other appropriate stakeholders, to study the connection between groundwater and surface water, the impacts of groundwater use on surface flow and beneficial uses, and the impacts of groundwater levels on the health of riparian vegetation in the Scott River watershed. The study should: (1) consider groundwater located both within and outside of the interconnected groundwater area delineated in the Scott River Adjudication,** (2) the amount of water transpired by trees and other vegetation, and (3), if deleterious impacts to beneficial uses are found, identify potential solutions including mitigation measures and changes to management plans. • Should the County determine that it and its stakeholders are able to commit to conducting the above study, the County, in cooperation with other stakeholders, shall develop a study plan by September 8, 2007. The study plan shall include: (1) goals and objectives; (2) data collection methods; (3) general locations of data collection sites; (4) data analysis methods; (5) quality control and quality assurance protocols; (6) responsible parties; (7) timelines and due dates for data collection, data analysis, and reporting; (8) financial resources to be used; and (9) provisions for adaptive change to the study plan and to the study based on additional study data and results, as they are available.
Flood Control & Bank Stabilization	<ul style="list-style-type: none"> • Parties Responsible for Flood Control Structures or Dredge, Fill, and/or Bank Stabilization Activities. • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board encourages parties responsible for levees and other flood control structures to plant and restore stream banks on and around existing flood control structures. • The Regional Water Board shall rely on existing authorities and regulatory tools, such as the 401 Water Quality Certification program, to ensure that flood control and bank stabilization activities in the Scott River watershed are conducted in a manner that minimizes the removal or suppression of vegetation that provides shade to a waterbody, prevents or minimizes sediment delivery, and minimizes changes in channel morphology that could increase water temperatures.

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Table 4-10 Scott River Sediment and Temperature TMDL Implementation Actions*

Topic	Responsible Parties	Actions
Timber Harvest	<ul style="list-style-type: none"> • Private & Public Parties Conducting Timber Harvest Activities. • Habitat Conservation Plan Holders. • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board shall use appropriate permitting and enforcement tools to regulate discharges from timber harvest activities in the Scott River watershed, including, but not limited to, cooperation with, and participation in, the California Department of Forestry and Fire Protection's timber harvest project approval process. • The Regional Water Board shall use, where applicable, general or specific waste discharge requirements and waivers of waste discharge requirements to regulate timber harvest activities on private and public lands in the Scott River watershed. • Timber harvest activities on private lands in the Scott River watershed are not eligible for Categorical Waiver C included in the Categorical Waiver of Waste Discharge Requirements for Discharges Related to Timber Harvest Activities on Non-Federal Lands in the North Coast Region (Order No. R1-2004-0016, as it may be amended or updated for time to time) simply through the adoption of this TMDL Action Plan. However, timber harvest activities on private lands in the Scott River watershed may be eligible for Categorical Waivers A, B, D, E, and F, as appropriate. • Where a Habitat Conservation Plan (HCP) is developed, Regional Water Board staff shall work with the HCP holder to develop, for Board consideration, ownership-wide waste discharge requirements for activities covered by the HCP, with any additional restrictions necessary to protect water quality and beneficial uses. • If current laws and regulation governing timber harvest (e.g., the Forest Practice Rules) are changed in a manner that reduces water quality protections, the Regional Board will use its authorities to maintain at a minimum the current level of water quality protection.
U.S. Forest Service U.S. Bureau of Land Management	<ul style="list-style-type: none"> • U.S. Forest Service (USFS). • U.S. Bureau of Land Management (BLM). • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board and federal land management agencies, including the USFS and the BLM, shall work together to draft and finalize Memoranda of Understanding (MOU) that shall address sediment waste discharges, elevated water temperatures, and grazing activities within the Scott River watershed. The MOUs shall be drafted and ready for consideration by the appropriate decision-making body(ies) by September 8, 2008. The following items shall be addressed during MOU development: Contents Related to Sediment Waste Discharges: <ol style="list-style-type: none"> 1. A date for the completion of an inventory of all significant sediment waste discharge sites and all roads on USFS/BLM land. A date for the completion of a priority list. 3. A date for the completion of a schedule for the repair and control of significant sediment waste discharge sites. 4. A date for the completion of a document describing the sediment control practices to be implemented by the USFS/BLM to repair and control sediment waste discharge sites. 5. A description of sediment control practices, road maintenance practices, and other management measures to be implemented by the USFS/BLM to prevent or minimize future sediment waste discharges. 6. A monitoring plan to ensure that sediment control practices are implemented as proposed and are effective at controlling discharges of sediment waste. 7. A commitment by the USFS/BLM to complete the inventory, develop the priority list, develop and implement the schedule, develop and implement sediment control practices, implement the monitoring plan, and conduct adaptive management.

CHAPTER 4. IMPLEMENTATION

Table 4-10 Scott River Sediment and Temperature TMDL Implementation Actions*

Topic	Responsible Parties	Actions
<p>U.S. Forest Service U.S. Bureau of Land Management</p>	<ul style="list-style-type: none"> • U.S. Forest Service (USFS). • U.S. Bureau of Land Management (BLM). • Regional Water Board. 	<p>Contents Related to Elevated Water Temperatures:</p> <ol style="list-style-type: none"> 1. A commitment by the USFS/BLM to continue to implement the Riparian Reserve buffer width requirements. 2. A monitoring plan to ensure that the Riparian Reserve buffer widths are effective at preventing or minimizing effects on natural shade. 3. A commitment by the USFS/BLM to implement the Riparian Reserve monitoring plan and conduct adaptive management. <p>Contents Related to Grazing Activities:</p> <p>A date for the completion of a description of grazing management practices and riparian monitoring activities implemented in grazing allotments on USFS/BLM lands.</p> <ol style="list-style-type: none"> 1. A commitment by the USFS/BLM and the Regional Water Board to determine if existing grazing management practices and monitoring activities are adequate and effective at preventing, reducing, and controlling sediment waste discharges and elevated water temperatures. 2. A commitment by the USFS/BLM to develop revised grazing management practices and monitoring activities, should existing measures be inadequate or ineffective, subject to the approval of the Regional Water Board's Executive Officer. 3. A commitment by the USFS/BLM to implement adequate and effective grazing management practices and monitoring activities and to conduct adaptive management.
<p>Grazing</p>	<ul style="list-style-type: none"> • Private Parties Conducting Grazing Activities. • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board encourages the parties responsible for grazing activities to take necessary actions to prevent, minimize, and control sediment waste discharges and elevated water temperatures. • The Regional Water Board's Executive Officer shall require parties responsible for grazing activities on private lands in the Scott River watershed to develop, submit, and implement a Grazing and Riparian Management Plan and a Monitoring Plan on an as-needed, site-specific basis. A Grazing and Riparian Management Plan shall describe, in detail, (1) sediment waste discharges and sources of elevated water temperatures caused by livestock grazing, (2) how and when such sources are to be controlled and monitored, and (3) management practices that will prevent and reduce future sources. By September 8, 2008, criteria shall be developed for determining when a Grazing and Riparian Management Plan shall be required, although nothing precludes the Executive Officer from requiring Grazing and Riparian Management Plans prior to this date. • Should human activities that will likely result in sediment waste discharges and/or elevated water temperatures be proposed or identified, through a Grazing and Riparian Management Plan or by other means, the responsible party(ies) shall be required to implement their Grazing and Riparian Management Plans and monitor through appropriate permitting or enforcement actions.
<p>Siskiyou RCD Scott River Watershed Council</p>	<ul style="list-style-type: none"> • Siskiyou Resource Conservation District (SRCD). • Scott River Watershed Council (SRWC). • Regional Water Board. 	<ul style="list-style-type: none"> • The Regional Water Board and staff shall increase efforts to work cooperatively with the SRCD and SRWC to provide technical support and information to landowners and stakeholders in the Scott River watershed and to coordinate educational and outreach efforts. • The Regional Water Board shall encourage the SRWC to (1) implement the strategic actions specified in the Strategic Action Plan and (2) assist landowners in developing and implementing management practices that are adequate and effective at preventing, minimizing, and controlling sediment waste discharges and elevated water temperatures.

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Table 4-10 Scott River Sediment and Temperature TMDL Implementation Actions*

Topic	Responsible Parties	Actions
Natural Resources Conservation Service University of California Cooperative Extension	<ul style="list-style-type: none"> • Natural Resources Conservation Service (NRCS). • University of California Cooperative Extension (UCCE) • Regional Water Board 	<ul style="list-style-type: none"> • The Regional Water Board shall increase efforts to work cooperatively with the NRCS and UCCE to provide technical support and information to responsible parties and stakeholders in the Scott River watershed and to coordinate educational and outreach efforts.
CA Dept. of Fish and Wildlife	<ul style="list-style-type: none"> • CA Dept of Fish and Wildlife (CDFW) • Regional Water Board 	<ul style="list-style-type: none"> • The Regional Water Board shall encourage the CDFW and aid, where appropriate, in the implementation of necessary tasks, actions, and recovery recommendations as specified in the Recovery Strategy for California Coho Salmon (CDFG/CDFW 2004) in the Scott River watershed.

* Although the Regional Water Board prefers to pursue the implementation actions listed in Table 4-10, the Regional Water Board shall take appropriate permitting and/or enforcement actions should any of the implementation actions fail to be implemented by the responsible party or should the implementation actions prove to be inadequate.

** Superior Court of Siskiyou County. 1980. Scott River Adjudication: Decree No. 30662..

IX. Glossary

Adjusted Potential Effective Shade:

The percentage of direct beam solar radiation attenuated and scattered before reaching the ground or stream surface from the potential vegetation conditions, reduced by 10% to account for natural disturbances such as fire, windthrow, disease, and earth movements that reduce the actual riparian vegetation below the site potential.

Compliance and Trend Monitoring:

Monitoring intended to determine, on a watershed scale, if water quality standards are being met, and to track progress towards meeting water quality standards.

Effective Shade:

The percentage of direct beam solar radiation attenuated and scattered before reaching the ground or stream surface from topographic and vegetation conditions.

Groundwater Accretion:

The gradual increase in surface flow in a stream resulting from the influx of groundwater.

Implementation Monitoring:

Monitoring used to assess whether activities and control practices were carried out as planned. This type of monitoring can be as simple as photographic documentation, provided that the photographs are adequate to represent and substantiate the implementation of control practices.

Instream Effectiveness Monitoring:

Monitoring of instream conditions to assess whether sediment control practices are effective at keeping waste sediment from being discharged to a waterbody. Instream effectiveness monitoring may be conducted upstream and downstream of the discharge point or before, during, and after the implementation of sediment control practices.

Potential Vegetation Conditions:

The most advanced seral stage that nature is capable of developing and making actual at a site in the absence of human interference. Seral stages are the series of plant communities that develop during ecological succession from bare ground to the climax community (e.g., fully mature, old-growth).

Road:

Any vehicle pathway, including, but not limited to: paved roads, dirt roads, gravel roads, public roads and highways, private roads, rural residential roads and driveways, permanent roads, temporary roads, seasonal roads, inactive roads, trunk roads, spur roads, ranch roads, timber roads, skid trails, and landings which are located on or adjacent to a road.

Salmonids:

Fish species in the family Salmonidae, including but not limited to, salmon, trout, and char.

Sediment:

Any inorganic or organic earthen material, including, but not limited to: soil, silt, sand, clay, and rock.

Sediment Waste:

Sediment that is generated directly or indirectly by anthropogenic activities or projects.

Sediment Waste Discharge Site:

An individual, anthropogenic erosion site that is currently discharging or has the potential to discharge sediment waste to waters of the State.

Thermal Refugia:

Colder areas within a water body that provide cold water refuge from unsuitably warm water.

Timber Harvest Activities:

Commercial and non-commercial activities relating to forest management and timberland conversions. These activities include the cutting or removal of both timber and other solid wood forest products, including Christmas trees. These activities include, but not limited to, construction, reconstruction and maintenance of roads, fuel breaks, firebreaks, watercourse crossings, landings, skid trails, or beds for the falling of trees; fire hazard abatement and fuel reduction activities; burned area rehabilitation; and site preparation that involves disturbance of soil or burning of vegetation following timber harvesting activities; but excluding preparatory tree marking, surveying, or road flagging.

Upslope Effectiveness Monitoring:

Monitoring intended to determine, by assessing upslope conditions, if sediment control practices are effective at keeping waste sediment from being discharged to a water body. This type of monitoring can be as simple as photographic documentation, provided that the photographs are adequate to represent and substantiate that the sediment control practices are effective.

4.2.10 Action Plan For The Shasta River Watershed Temperature And Dissolved Oxygen Total Maximum Daily Loads²³

The Shasta River watershed (CalWater Hydrologic Area 105.50), which includes all tributaries and Lake Shastina, comprises approximately 508,734 acres (795 mi²) in Siskiyou County. The Shasta River is tributary to the Klamath River. This Action Plan for the Shasta River Temperature and Dissolved Oxygen Total Maximum Daily Loads, hereinafter known as the Shasta River TMDL Action Plan, includes temperature and dissolved oxygen total maximum daily loads (TMDLs) and describes the implementation actions necessary to achieve the TMDLs and attain water quality standards in the Shasta River watershed. The goal of the Shasta River TMDL Action Plan is to achieve the TMDLs, and thereby achieve dissolved oxygen and temperature related water quality standards, including the protection of the beneficial uses of water in the Shasta River watershed.

The Shasta River TMDL Action Plan sets out the loads and conditions to be considered and incorporated into regulatory and non-regulatory actions in the Shasta River watershed. The Shasta River TMDL Action Plan is not directly and independently enforceable, except as incorporated into appropriate permitting or enforcement orders.

A glossary defining key terms (**bolded first time used**) is located at Part IX of this Action Plan.

I. Problem Statement

The Shasta River watershed was listed as impaired for organic enrichment/dissolved oxygen in 1992, and as impaired for temperature in 1994, pursuant to Section 303(d) of the Clean Water Act. These listings were confirmed in the TMDL analysis. Dissolved oxygen concentrations are regularly too low to comply with the Basin Plan dissolved oxygen objectives. Water temperature conditions regularly exceed temperature thresholds protective of **salmonids**.

Low dissolved oxygen concentrations and elevated water temperatures in the Shasta River, its tributaries, and Lake Shastina have resulted in degraded water quality conditions that do not meet applicable water quality objectives and that impair designated beneficial uses. The designated beneficial uses that are not fully supported include: cold freshwater habitat (COLD); rare, threatened, and endangered species (RARE); migration of aquatic organisms (MIGR); and spawning, reproduction, and/or early development of fish (SPWN); commercial and sport fishing (COMM); and contact and non-contact water recreation (REC-1 and REC-2). The designated beneficial uses associated with the cold freshwater salmonid fishery (COMM, COLD, RARE, MIGR, SPWN) are the designated beneficial uses most sensitive to the dissolved oxygen and water temperature impairments. Important species in the Shasta River watershed include coho and Chinook salmon, trout, and lamprey. These, as well as green sturgeon, are also significant species in the Klamath River.

The Klamath River, to which the Shasta River is a major tributary, is also listed as impaired for low dissolved oxygen, high water temperature, and high nutrient levels. The Klamath River has additional beneficial uses that are not designated for the Shasta River that may be adversely affected by inputs from the Shasta River. These beneficial uses include the Native American cultural use (CUL) that supports cultural and traditional rights of indigenous people, such as ceremonial uses, and the subsistence fishing use (FISH).

II. Watershed Restoration Efforts

Throughout the Shasta River watershed, many individuals, groups, and agencies have been working to enhance and restore fish habitat and water quality. These groups include, but are not limited to, the Shasta Valley Resource Conservation District, the Shasta River Coordinated Resources Management and Planning Committee, private timber companies, the Natural Resource Conservation Service, Siskiyou County and the Five Counties Salmonid Conservation Program, the California Department of Fish and Game, the California Department of Water Resources, the United States Forest Service, and the Klamath River Basin Fisheries

²³ Adopted by the North Coast Regional Water Quality Control Board on June 29, 2006. Adopted by the State Water Resources Control Board on November 15, 2006. Approved by the State Office of Administrative Law on January 9, 2007. Approved by the United States Environmental Protection Agency on January 26, 2007.

Task Force. The past and present efforts of these stakeholders have improved water quality conditions in the Shasta River and its tributaries.

III. Temperature

A. Shasta River Temperature Source Analysis

The Shasta River temperature source analysis identifies the sources (or factors) that affect the temperature of the Shasta River watershed. Five primary factors have been identified as affecting stream temperatures in the Shasta River watershed. Human activities have affected, or have a potential to affect, each of these factors. The factors include:

- Reduced stream shade resulting from agricultural practices including grazing and livestock activities;
- Tailwater return flows;
- Flow modification and diversion;
- Spring inflow; and
- Lake Shastina and minor channel impoundments.

In addition, microclimate alterations resulting from near-stream vegetation removal may increase temperatures, where microclimates exist. Changes in channel geometry from natural conditions can also negatively affect water temperatures. These factors have not been quantified for the Shasta River temperature TMDL.

B. Shasta River Temperature TMDL

The “loading capacity” refers to the total loading of a pollutant that a water body can assimilate and still meet water quality objectives and protect beneficial uses. For the temperature TMDL the water quality objective of concern is the temperature objective, which prohibits the alteration of the natural receiving water temperature unless such alteration does not adversely affect beneficial uses. The loading capacity provides a reference for calculating the amount of pollutant load reduction needed to bring a waterbody into compliance with standards. The starting point for the load allocation analysis is the equation that describes the Total Maximum Daily Load or loading capacity:

$$\text{TMDL} = \text{Loading Capacity} = \Sigma\text{WLAs} + \Sigma\text{LAs} + \text{Natural Background}$$

where Σ = the sum, WLAs = waste load allocations, and LAs = load allocations. Waste load allocations are contributions of a pollutant from point sources, while load allocations are contributions from management-related non-point sources. There are no point source heat loads in the Shasta River watershed, and therefore no waste load allocations apply.

The Shasta River watershed temperature TMDL loading capacity is equal to the **potential percent solar radiation transmittance** for the mainstem Shasta River below Dwinnell Dam, **adjusted potential effective shade** for the Shasta River above Dwinnell Dam and on tributaries, no net increase in receiving water temperature from tailwater return flows, and a flow regime that results in reductions in maximum daily temperature of 1.5°C, 1.2°C, and 2.1°C for compliance points at river miles (RM) 24.1, 15.5, and 5.6, respectively.

The TMDL equation is:

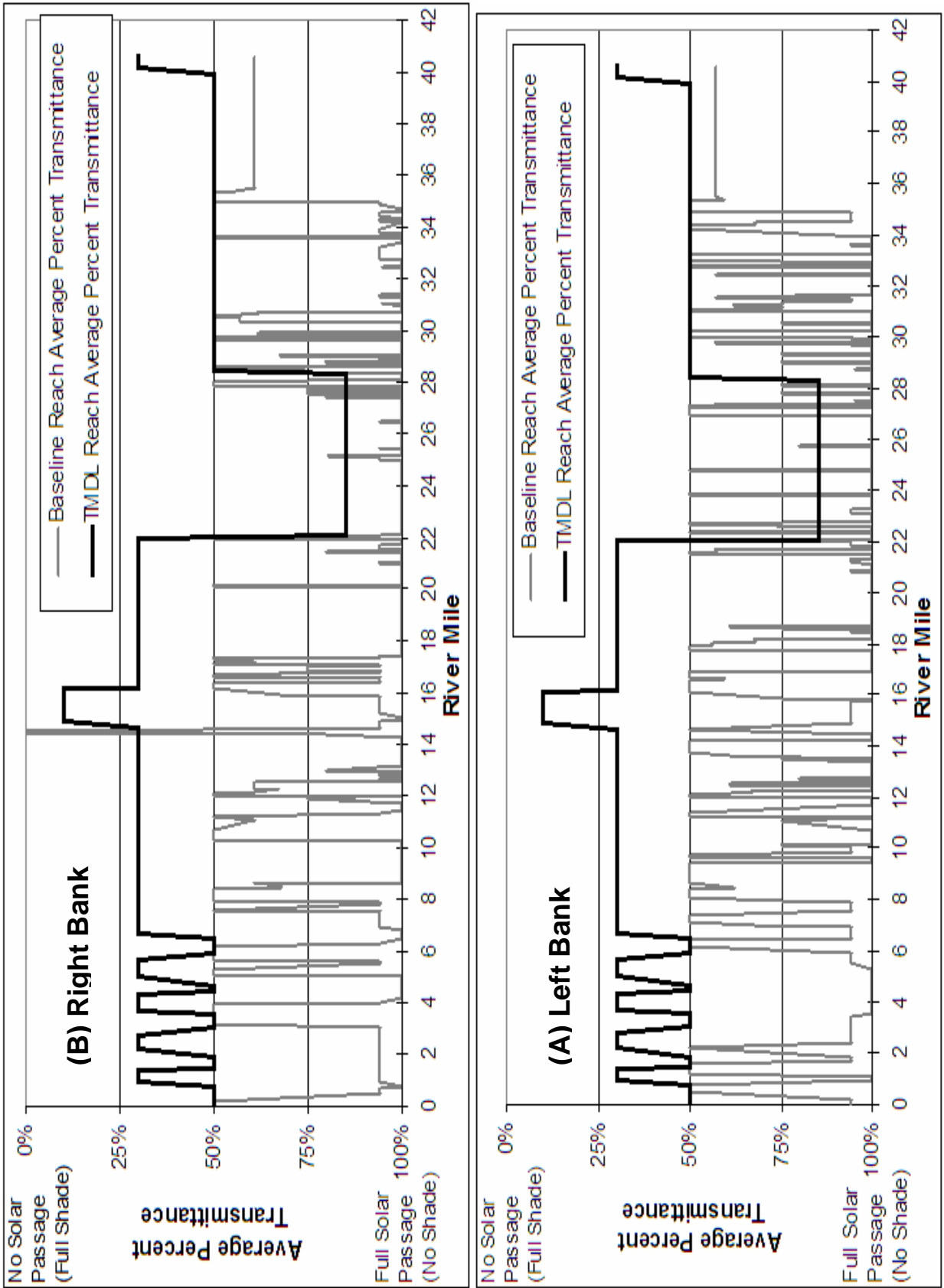
$$\begin{aligned} \text{TMDL} = \text{Loading Capacity} = & \\ & \text{Potential Percent Solar Radiation Transmittance of the Shasta River} \\ & + \text{Adjusted Potential Effective Shade of the Tributaries} \\ & + \text{No Net Increase in Temperature from Tailwater Return Flows} \\ & + \text{Flow Increases that Achieved Specific Temperature Reductions at Compliance Locations.} \end{aligned}$$

C. Shasta River Temperature Load Allocations

In accordance with the Clean Water Act, the Shasta River temperature TMDL is allocated to sources of elevated water temperature in the watershed. As there are no known point source heat loads to the Shasta River, the TMDL is allocated among the non-point source heat loads in the watershed. The non-point sources include (1) solar heat load (i.e., sunlight) at streamside (riparian) locations in the watershed, (2) heat load from tailwater return flows, and (3) reduced assimilative capacity from surface water flow reductions.

In order to quantify the part of the TMDL focused on solar heat loads that arise from changes in streamside vegetation, and to be able to compare it to current conditions, two surrogate measures are used: (1) potential percent solar radiation transmittance at locations along the mainstem Shasta River below Dwinnell Dam, and (2) adjusted potential effective shade at locations upstream of Dwinnell Dam and along tributary streams (see Glossary). Landowners and operators in the mainstem Shasta River below Dwinnell Dam are allocated loads equal to potential percent solar radiation transmittance, as tabulated in Table 4-11 and depicted in Figure 4-6. Landowners and operators on the Shasta River above Dwinnell Dam and on tributaries are allocated loads equal to adjusted potential effective shade, which is equal to 90% of site potential shade, to allow for natural riparian disturbances such as floods, wind throw, disease, landslides, and fire. The load allocation for tailwater return flow sources within the Shasta River watershed is a zero net increase in receiving water temperature.

FIGURE 4-6 EXISTING (BASELINE) AND POTENTIAL SOLAR RADIATION TRANSMITTANCE FOR THE LEFT BANK (A) AND RIGHT BANK (B) OF THE CLACKA RIVER



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Table 4-11 Solar Heat Load Allocations for the Mainstem Shasta River, Expressed as the potential percent solar radiation transmittance by river reach.

River Reach	Upstream River Mile	Downstream River Mile	Potential Reach Average Percent Transmittance ¹
Dwinnell Dam to Riverside Road	40.6	39.9	30
Riverside Road to u/s of A12	39.9	28.3	50
U/S of A12 to near DeSoza Lane	28.3	22.0	85
Near DeSoza Lane to u/s of Montague-Grenada Road	22.0	16.1	30
Near Montague-Grenada Road	16.1	14.6	10
D/S Montague-Grenada Road to Hwy 263	14.6	7.3	30
Hwy 263 to mouth	7.3	0	30 to 50 ²

¹ Daylight-hour average percent transmittance for given reach.

² Alternates between 30% and 50%.

Table 4-12 Shasta River Watershed Temperature Load Allocations

Source	Allocation
Change in Riparian Vegetation	Shasta River below Dwinnell Dam: Reach average potential solar radiation transmittance, as presented in Table 4-11 and Figure 4-6. Shasta River above Dwinnell Dam and Tributaries: Adjusted potential effective shade = 90% of site potential effective shade.
Irrigation Return Flow	No net increase in receiving water temperature.
Surface Water Flow	Reductions in the maximum daily stream temperatures of 1.5°C, 1.2°C, and 2.1°C from baseline at RM 24.1, RM 15.5, and RM 5.6

The load allocation for surface water flow is a reduction in the maximum daily stream temperatures of 1.5°C, 1.2°C, and 2.1°C from baseline at RM 24.1, RM 15.5, and RM 5.6, respectively. These are the temperature compliance locations for the TMDL.

Table 4-12 summarizes the temperature load allocations for the Shasta River watershed.

D. Shasta River Temperature Margin of Safety, Seasonal Variations, and Critical Conditions

The temperature TMDL includes an implicit margin of safety, based on conservative assumptions and uncertainties. The **water quality compliance model scenario** incorporated temperature reductions from Big Springs Creek and Parks Creek to account for improvements associated with riparian shade and tailwater management, but did not incorporate temperature reductions from Yreka Creek and other small tributaries to the Shasta River, and provides a margin of safety. Topographic shade was not considered in the temperature model and is likely a factor in the Shasta canyon, and provides a margin of safety. Some improvements in stream temperature that may result from reduced **sediment** inputs are not quantified. Reduced sediment loads could lead to increased frequency and depth of pools, independent of changes in solar radiation input. These changes tend to result in lower stream temperatures overall and increase the amount of lower temperature pool habitat. These expected changes are not directly accounted for in the TMDL. Finally, the effects of changes to streamside riparian areas toward mature trees will tend to create microclimates that will lead to improvements in stream temperatures. These effects were not accounted for in the temperature analysis and provide a margin of safety.

To account for annual and seasonal variability, the Shasta River temperature TMDL analysis evaluated temperatures and thermal processes from late-spring through mid-fall, considered the most critical time period for the most sensitive beneficial uses. The critical period, defined as May 15 to October 15, accounts for seasonal variation and provides an implicit margin of safety because during this period the air temperature is above average, the flow is below average, and the most sensitive beneficial uses – SPWN and COLD – are present. Sensitive life stages exist in Shasta River watershed throughout the year, but summer water temperatures represent the most critical conditions with respect to temperature and the most sensitive beneficial uses.

IV. Dissolved Oxygen

A. Shasta River Dissolved Oxygen Source Analysis

Dissolved oxygen levels in surface waters are controlled by a number of interacting processes including: photosynthesis, respiration, **carbonaceous deoxygenation**, **nitrogenous deoxygenation** and nitrification, reaeration, **sediment oxygen demand (SOD)**, water temperature, salinity, flow, and atmospheric pressure. The primary processes affecting dissolved oxygen concentrations in the Shasta River watershed are photosynthesis and respiration of aquatic plants, nitrogenous deoxygenation (termed **nitrogenous biochemical oxygen demand** or NBOD), and sediment oxygen demand. The following anthropogenic sources or factors, in no special order, adversely affect dissolved oxygen conditions in the Shasta River:

- Tailwater return flows;
- City of Yreka nonpoint and wastewater infiltration sources;
- Lake Shastina and minor impoundments;
- Agricultural practices including grazing and livestock activities that reduce riparian shade and deliver oxygen consuming materials to surface waters; and
- Flow modification and diversion.

B. Shasta River Dissolved Oxygen TMDL

The dissolved oxygen “loading capacity” of the Shasta River is the total net daily oxygen demand that results in attainment of the dissolved oxygen objectives. For the dissolved oxygen TMDL the water quality objective of concern is the minimum dissolved oxygen objective of 7.0 mg/L for the Shasta River. There are no known point sources of oxygen-demanding constituents to the Shasta River and tributaries. Each of the components that exert an oxygen demand on the Shasta River is attributed to nonpoint sources, and includes respiration of aquatic plants, SOD, and NBOD.

The dissolved oxygen loading capacity of the Shasta River is 12,353 pounds of oxygen demand per day, and is expressed as the following Shasta River dissolved oxygen TMDL equation:

$$\text{TMDL} = \text{Loading Capacity} = 12,353 \text{ lbs O}_2/\text{day}$$

C. Shasta River Dissolved Oxygen Load Allocations

In accordance with the Clean Water Act, the Shasta River dissolved oxygen TMDL is allocated to the sources of oxygen demand in the watershed. There are no known point sources of oxygen-demanding constituents in the Shasta River watershed, and therefore the waste load allocation is set to zero. Therefore, the TMDL includes oxygen demand from natural and non-point anthropogenic sources. The load allocations are assigned to reaches of the Shasta River as identified in Table 4-13, and account for the total net daily oxygen demand for the designated river reaches. Responsibility for meeting these river reach allocations is assigned to the landowners whose operations contribute to water quality conditions within the specified reaches. In addition to these river-reach load allocations, allocations are applied to several river inputs that require NBOD reductions in order to achieve water quality compliance, including Dwinnell Dam outflow, Yreka Creek, and tailwater return flow. These allocations are assigned as NBOD concentrations of 0.91 mg/L for both Dwinnell Dam outflow and Yreka Creek, and 0.85 mg/L for all tailwater return flow.

Meeting the dissolved oxygen TMDL and load allocations requires:

- Fifty percent reduction in respiration rates of instream aquatic plants;
- Fifty percent reduction in SOD rates behind minor impoundments;
- Reduced NBOD input concentrations; and
- Increased dedicated cold water instream surface water flow.

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D. Shasta River Dissolved Oxygen Margin of Safety, Seasonal Variations, and Critical Conditions

The TMDL includes an implicit margin of safety to account for uncertainties in the analysis and because conservative assumptions are used in the TMDL analysis. The water quality compliance model scenario, which is the basis for the dissolved oxygen TMDL, includes a 50% reduction of sediment oxygen demand only at locations behind minor impoundments in the Shasta River. Fine sediment and organic material load reductions from tailwater return flows that can be achieved via controls targeting NBOD reductions would result in reductions in sediment oxygen demand in the entire river, not

Table 4-13 Shasta River TMDL River Reach Load Allocations and Total Oxygen Demand Reductions Needed for Water Quality Compliance

REACH	Reach Length (mi)	Hourly Demand Existing (Baseline) Conditions (lbs/hr)	Hourly Demand Water Quality Compliance Conditions (lbs/hr)	Reduction In Oxygen Demand Needed To Achieve Water Quality Compliance	
				(lbs/hr)	%
Dwinnell Reservoir - Riverside Drive	0.7	(12)	(8)	4	30%
Riverside Drive - Parks Creek	5.0	(72)	(40)	32	44%
Parks Creek - Big Springs Creek	1.3	(33)	(21)	13	38%
Big Springs Creek - Highway A-12	9.6	(331)	(217)	114	35%
Highway A-12 - Shasta River @ Freeman Lane	5.0	(147)	(93)	54	37%
Shasta River @ Freeman Lane - DWR Weir	3.6	(73)	(39)	33	46%
DWR Weir - Yreka-Ager Road	4.4	(62)	(31)	31	50%
Yreka-Ager Road - Anderson Grade Road	3.1	(52)	(27)	26	49%
Anderson Grade Road - Mouth	8.1	(77)	(39)	38	49%

REACH	Reach Length (mi)	24 Hour Demand Existing (Baseline) Conditions (lbs/day)	24 Hour Demand Water Quality Compliance Conditions (lbs/day)	Reduction In Oxygen Demand Needed To Achieve Water Quality Compliance	
				(lbs/day)	%
Dwinnell Reservoir - Riverside Drive	0.7	(285)	(198)	87	30%
Riverside Drive - Parks Creek	5.0	(1,722)	(957)	765	44%
Parks Creek - Big Springs Creek	1.3	(797)	(494)	304	38%
Big Springs Creek - Highway A-12	9.6	(7,937)	(5,197)	2,741	35%
Highway A-12 - Shasta River @ Freeman Lane	5.0	(3,529)	(2,226)	1,303	37%
Shasta River @ Freeman Lane - DWR Weir	3.6	(1,749)	(947)	803	46%
DWR Weir - Yreka-Ager Road	4.4	(1,492)	(749)	743	50%
Yreka-Ager Road - Anderson Grade Road	3.1	(1,253)	(637)	616	49%
Anderson Grade Road - Mouth	8.1	(1,857)	(948)	909	49%

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just behind impoundments. This represents a margin of safety. In addition, the water quality compliance model scenario does not include **biochemical oxygen demand** (CBOD) concentration reductions. Controls targeting NBOD reductions from tailwater return flows, Dwinell Dam outflow, and Yreka Creek would result in reductions in CBOD concentrations, and provide a margin of safety.

The dissolved oxygen analysis was conducted for the period from late-spring through mid-fall. This critical period, defined as May 15 to October 15, accounts for seasonal variation and provides an implicit margin of safety because during this period the air temperature is above average, the flow is below average, and the most sensitive beneficial uses – SPWN and COLD – are present. Sensitive life stages exist in the Shasta River watershed throughout the year, but summer conditions represent the most critical conditions with respect to dissolved oxygen. This critical period also corresponds to the time of greatest photoperiod and highest water temperature, both of which contribute to low dissolved oxygen concentrations. To account for the possibility that excursions below the TMDL may occur during periods of time other than the critical period, the TMDL is established as a year-round load.

V. Implementation

Specific implementation actions that the Regional Water Board and other responsible parties shall pursue to achieve the TMDLs and meet the dissolved oxygen and temperature related water quality standards in the Shasta River and tributaries are described in Table 4-14. Table 4-14 is organized by source or land use activity, and responsible party(ies) considered appropriate to implement TMDL actions. Responsible parties may find that more than one implementation action is applicable to their circumstances. Action items are fully independent from each other and require 100% implementation within each Source or Land Use category. The implementation actions are designed to encourage and build upon on-going, proactive restoration and enhancement efforts in the watershed. Additionally, the implementation actions described in Table 4-14 are necessary to comply with the California's Nonpoint Source Pollution Control Program (NPS Policy), and include the five required key elements as described in the NPS Policy.

The Regional Water Board hereby waives the requirement to file a Report of Waste Discharge (RWD) and obtain Waste Discharge Requirements (WDR), pursuant to Water Code section 13269, for discharges addressed by this Action Plan for dischargers that choose to participate in the on-going collaborative programs and implement recommended measures as applicable, as described in Table 4-14. Should a discharger choose not to participate, or if the Regional Water Board's Executive Officer determines additional measures are necessary and provides the discharger with written notice to that effect, the discharger must submit a Report of Waste Discharge (RWD) and filing fee to the Regional Water Board immediately or in accordance with the written notice.

If the implementation actions identified in Table 4-14 fail to be implemented by the responsible party or if the implementation actions prove to be inadequate the Regional Water Board shall take additional permitting and/or enforcement actions, as necessary. The State and Regional Water Boards shall require compliance with the conditions pursuant to which the waiver is granted. This conditional waiver shall not apply to any discharges for which a WDR, waiver, or prohibition is issued under a separate action of the Board. This conditional waiver expires upon Regional Water Board adoption of a superseding regulatory action after the evaluation period specified below for each source category, or after five years, whichever occurs first. This waiver is conditional and may be terminated at any time by the State or Regional Water Board.

VI. Enforcement

The Regional Water Board shall take enforcement actions for violations of the Shasta River TMDL Action Plan where elements of the TMDL Action Plan are made enforceable restrictions in a specific permit or order, as appropriate. If necessary, Regional Water Board staff may propose appropriate enforcement actions for human activities that result in discharges, including but not limited to the removal or suppression of vegetation that provides shade to a water body in the Shasta River watershed. Enforcement implementation is ongoing. Nothing in this TMDL Action Plan precludes actions to enforce any directly applicable prohibition or provisions found elsewhere in the Basin Plan or to require clean up and abatement of existing sources of pollution where appropriate.

VII. Monitoring

Monitoring is important for determining the success of the TMDL Action Plan in achieving dissolved oxygen and temperature water quality standards. Monitoring shall be conducted upon the request of the Regional Water Board's Executive Officer in conjunction with existing and/or proposed human activities that will likely result in increased dissolved oxygen and reduced water temperatures in the Shasta River watershed. Monitoring may involve implementation, upslope effectiveness, photo documentation, instream and near-stream effectiveness (e.g. riparian buffer establishment affecting nutrient discharges), and/or **compliance and trend monitoring** (e.g. temperature and dissolved oxygen, Potential Percent Solar Radiation Transmittance, time predicated dissolved oxygen sampling, nutrients, sediment oxygen demand, nitrates and nitrites, and any other parameters reflective of improvements toward achieving the TMDL). Monitoring parameters and frequency, numeric and narrative objectives, and other appropriate metrics shall be based on locations consistent with those reaches representative of the TMDL.

The Regional Water Board's Executive Officer will base the decision to require monitoring on site-specific conditions, the size and location of the discharger's ownership, and/or the type and intensity of land uses being conducted or proposed by the discharger. If monitoring is required, the Regional Water Board's Executive Officer may direct the discharger to develop a monitoring plan and may describe specific monitoring requirements to include in the plan.

VIII. Reassessment and Adaptive Management

The Regional Water Board will review, reassess, and possibly revise the Shasta River TMDL Action Plan. Reassessment is likely to occur every three years during the Basin Planning Triennial Review process. Regional Water Board staff will report to the Regional Water Board at least yearly on the status and progress of implementation activities, and on whether current efforts are reasonably calculated and on track to achieve water quality standards. In addition to the evaluation periods for individual source categories specified in Table 4-14, Regional Water Board staff will conduct a comprehensive and formal assessment of effectiveness of collaborative efforts in the on-going programs and additional efforts recommended by the Action Plan within five years from the date of EPA approval (by January 26, 2012). A more extensive reassessment will occur ten years from the date the TMDL Action Plan is effective, or sooner, if the Regional Water Board determines it necessary. During reassessment, the Regional Water Board is likely to consider how effective the requirements of the TMDL Action Plan are at meeting the TMDLs, achieving dissolved oxygen and temperature water quality objectives, and protecting the beneficial uses of water in the Shasta River watershed.

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
Range and Riparian Land Management	<ul style="list-style-type: none"> Parties Conducting Grazing Activities Landowners and managers owning and operating property adjacent to the Shasta River and its tributaries 	<p>Landowner/User Actions: Landowners should employ land stewardship practices and activities that minimize, control, and preferably prevent discharges of fine sediment, nutrients, and other oxygen consuming materials from affecting waters of the Shasta River and tributaries. Landowners should also employ land stewardship practices and activities that minimize, control, and preferably prevent elevated solar radiation loads from affecting waters of the Shasta River and its Class I and II tributaries.</p> <p>Those that oversee and manage grazing and range land activities in the Shasta River watershed should implement the applicable management measures for agriculture and grazing from the following sources:</p> <ul style="list-style-type: none"> Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program (NPS Policy) (SWRCB 2004 or as amended). Shasta Watershed Restoration Plan (November 1997). Shasta Valley Resource Conservation District Master Incidental Take Permit (ITP) Application (Shasta RCD 2005). Recovery Strategy for California Coho Salmon (Coho Recovery Strategy) (CDFG 2004). <p>See Appendix A of this Action Plan for examples of some of these applicable measures.</p> <p>Landowners may need to develop and implement management measures in addition to those specified above to address site-specific conditions. This may include determining appropriate riparian widths for tree planting activities such that the appropriate width buffer is created to ensure effective stream shading and oxygen consuming material discharge elimination.</p> <p>Landowners shall submit annually to the Regional Water Board a written summary of all range and riparian management actions taken to achieve compliance with water quality standards, the TMDLs, and the NPS Policy, either individually or through the Shasta Valley RCD and its CRMP or through the CDFG Coho ITP.</p> <p>RCD Actions: The Shasta Valley RCD and its CRMP should:</p> <ul style="list-style-type: none"> Assist landowners in developing and implementing management practices that minimize, control and preferably prevent discharges of fine sediment, nutrients and other oxygen consuming materials, as well as elevated solar radiation loads from affecting waters of the Shasta River and tributaries. Assist landowners in developing and implementing a monitoring program to evaluate and document implementation and effectiveness of the range and riparian management actions taken by the landowner. <p>State Actions: CDFG will:</p> <ul style="list-style-type: none"> Assist landowners in developing and implementing management practices that minimize, control, and preferably prevent discharges of fine sediment, nutrients and other oxygen consuming materials as well as elevated solar radiation loads from affecting waters of the Shasta River and tributaries
	<ul style="list-style-type: none"> Shasta Valley Resource Conservation District (Shasta Valley RCD) Shasta Coordinated Resource Management and Planning Committee (Shasta CRMP) California Department of Fish and Game (CDFG) 	

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions (cont.)		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
Range and Riparian Land Management (cont.)	<ul style="list-style-type: none"> • CDFG (cont.) • Regional Water Board 	<ul style="list-style-type: none"> • Administer the Coho Recovery Strategy and the ITP (when approved). <p>The Regional Water Board will:</p> <ul style="list-style-type: none"> • Work cooperatively with the Shasta Valley RCD and its CRMP to: <ol style="list-style-type: none"> 1. Provide technical support and information to individuals, landowners, and community members in the Shasta River watershed. 2. Coordinate monitoring, educational and outreach efforts. 3. Develop a monitoring program to evaluate and document implementation and effectiveness of the range and riparian management actions taken by the landowners. • Should efforts fail to be implemented or effective, the Regional Water Board's Executive Officer shall require, on a site specific as-needed basis, the appropriate responsible parties to develop, submit, and implement a ranch management plan designed to prevent discharges of fine sediment, nutrients and other oxygen consuming materials, as well as elevated solar radiation loads from affecting waters of the Shasta River and tributaries. <p>The ranch management plan shall describe in detail:</p> <ol style="list-style-type: none"> 1. Locations discharging and/or with the potential to discharge nutrients and other oxygen consuming materials, and elevated solar radiation loads to watercourses which are caused by livestock grazing or related activities. 2. How and when identified sites are to be controlled and monitored, and management practices that will be implemented to prevent and reduce future discharges of nutrient and other oxygen consuming materials, and elevated solar radiation loads to the Shasta River and its tributaries. <p>Group and/or individual ranch management plans shall be implemented upon review, comment, and approval by Regional Water Board staff and their Executive Officer for compliance with water quality standards, the TMDLs, and the NPS Policy.</p> <ul style="list-style-type: none"> • The Regional Water Board shall address the removal and suppression of vegetation that provides shade to a water body through development of a Stream and Wetland System Protection Policy. This will be a comprehensive, region-wide riparian policy that will address the importance of shade on instream water temperatures and will potentially propose riparian setbacks and buffer widths. The Policy will likely propose new rules and regulations, and will therefore take the form of an amendment to the Basin Plan. Other actions under this section may be modified for consistency with this policy, once adopted. With funding already available through a grant from the U.S. EPA, Regional Water Board staff are scheduled to develop this Policy for Regional Water Board consideration and adoption by the end of 2007. • Within two years of EPA approval of the TMDL Action Plan (by January 26, 2009), the Regional Water Board's Executive Officer shall report to the Regional Water Board on the status of the preparation and development of appropriate permitting actions.

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions (cont.)		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
Range and Riparian Land Management (cont.)	<ul style="list-style-type: none"> Regional Water Board (cont.) 	<ul style="list-style-type: none"> The Regional Water Board shall take appropriate permitting actions as necessary to address the removal and suppression of vegetation that provides shade to a water body in the Shasta River watershed. Such actions may include, but are not limited to, prohibitions, waste discharge requirements (WDRs) or waivers of WDRs for grazing and rangeland activities, farming activities near water bodies, stream bank stabilization activities, and other land uses that may remove and/or suppress vegetation that provides shade to a water body. Should prohibitions, waivers or WDRs be developed, they may apply to the entire North Coast Region or just to the Shasta River watershed. Within ten years of EPA approval of the TMDL (by January 26, 2017), all identified discharges associated with riparian land use activities shall be in compliance with water quality standards, the TMDLs, and the NPS Policy.
Tailwater Return Flows	<ul style="list-style-type: none"> Irrigators Shasta Valley RCD Shasta CRMP 	<p>Landowner Actions: Those that oversee and manage tailwater discharges from irrigated lands in the Shasta River watershed, which may include landowners, lessees, and land managers (collectively referred to as irrigators), should employ land stewardship and irrigation management practices and activities that minimize, control, and preferably prevent discharges of fine sediment, nutrients and other oxygen consuming materials, and elevated water temperatures from affecting waters of the Shasta River and its tributaries.</p> <p>Irrigators should implement the applicable management measures for tailwater return flows from the following sources:</p> <ul style="list-style-type: none"> Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program (NPS Policy) (SWRCB 2004 or as amended). Shasta Watershed Restoration Plan (November 1997). Shasta Valley Resource Conservation District Master Incidental Take Permit (ITP) Application (Shasta RCD 2005). Recovery Strategy for California Coho Salmon (Coho Recovery Strategy) (CDFG 2004). <p>See Appendix B of this Action Plan for examples of some of these tailwater return flow measures.</p> <p>In addition, landowners may develop and implement management measures suitable for their site-specific conditions.</p> <p>Irrigators should submit annually to the Regional Water Board a written summary of all tailwater return flow management actions taken to help achieve compliance with water quality standards, the TMDLs, and the NPS Policy, either individually or through the Shasta Valley RCD and its CRMP or through the CDFG Coho ITP.</p> <p>RCD Actions: The Shasta Valley RCD and its CRMP should:</p> <ul style="list-style-type: none"> Assist irrigators in developing and implementing management practices that minimize, control and preferably prevent discharges of fine sediment, nutrients and other oxygen consuming materials, and elevated water temperatures from affecting waters of the Shasta River and its tributaries.

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions (cont.)		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
Tailwater Return Flows (cont.)	<ul style="list-style-type: none"> • Shasta Valley RCD and Shasta CRMP (cont.) • CDFG • Regional Water Board 	<ul style="list-style-type: none"> • Implement the recommended actions specified in the Shasta Watershed Restoration Plan, Coho Recovery Strategy, and the ITP (when approved). • Assist irrigators in developing and implementing a monitoring program to evaluate and document implementation and effectiveness of the tailwater management actions taken by the irrigators. <p>State Actions: CDFG will:</p> <ul style="list-style-type: none"> • Assist irrigators in developing and implementing management practices that minimize, control, and preferably prevent discharges of fine sediment, nutrients and other oxygen consuming materials, and elevated water temperatures from affecting waters of the Shasta River and its tributaries. • Administer the Coho Recovery Strategy and the ITP (when approved). <p>Regional Water Board will:</p> <ul style="list-style-type: none"> • Work with the Shasta Valley RCD and its CRMP to develop a monitoring program to evaluate and document implementation and effectiveness of the tailwater management actions taken by the irrigators. • Evaluate the effectiveness of tailwater management actions and develop recommendations for the most effective regulatory vehicle to bring tailwater discharges into compliance with water quality standards, the TMDLs, and the NPS Policy. • Should efforts fail to be implemented or effective, the Regional Water Board's Executive Officer may require irrigators, on a site specific as-needed basis, to develop, submit, and implement, upon review, comment and approval by the Regional Water Board's Executive Officer, a tailwater management plan designed to prevent discharges of fine sediment, nutrients and other oxygen consuming materials, and elevated solar radiation loads from affecting waters of the Shasta River and its tributaries. • Within one year of EPA approval of the TMDL (by January 26, 2008), the Regional Water Board's Executive Officer shall report to the Regional Water Board on the status of the preparation and development of appropriate permitting actions to bring the discharge into compliance with water quality standards, the TMDLs, and the NPS Policy. • Within five years of EPA approval of the TMDL (by January 26, 2012) and based on Regional Water Board staff recommendation(s) derived from the evaluation phase for tailwater management, the Regional Water Board shall adopt prohibitions, WDRs, waivers of WDRs, or any combination thereof, as appropriate. • Within ten years of EPA approval of the TMDL (by January 26, 2017), the discharge of all tailwater return flow shall be in compliance with water quality standards, the TMDLs, and the NPS Policy.

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions (cont.)		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
Water Use and Flow	<ul style="list-style-type: none"> Water Diverters Shasta Valley RCD Shasta CRMP CDFG 	<p>Water Diverter(s) Actions: Water diverters should employ water management practices and activities that result in increased dedicated cold water instream flow in the Shasta River and its tributaries.</p> <p>Water diverters should participate in and implement applicable flow-related measures outlined in the following sources:</p> <ul style="list-style-type: none"> <i>Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program</i> (NPS Policy) (SWRCB 2004 or as amended). <i>Shasta Watershed Restoration Plan</i> (November 1997). <i>Shasta Valley Resource Conservation District Master Incidental Take Permit (ITP) Application</i> (Shasta RCD 2005). <i>Recovery Strategy for California Coho Salmon</i> (Coho Recovery Strategy) (CDFG 2004). <p>See Appendix C of this Action Plan for examples of flow related measures.</p> <p>In addition, landowners may develop and implement management measures suitable for their site-specific conditions.</p> <p>Within two years (by January 26, 2009), and again within four years of EPA approval of the TMDL (by January 26, 2011), water diverters shall report in writing to the Regional Water Board, either individually or through the Shasta Valley RCD and its CRMP, on the measures taken to increase the dedicated cold water instream flow in the Shasta River by 45 cfs or alternative flow regime that achieves the same temperature reductions from May 15 to October 15.</p> <p>Within five years of EPA approval of the TMDL (by January 26, 2012), water diverters shall provide a final report to the Regional Water Board, either individually or through the Shasta Valley RCD and its CRMP, on documenting dedicated cold water instream flow in the Shasta River in relation to the 45 cfs goal or alternative flow regime that achieves the same temperature reductions from May 15 to October 15.</p> <p>This recommended flow measure does not alter or reallocate water rights in the Shasta or Klamath River watersheds, nor bind the Regional Water Board in future TMDLs, the State Water Board's Division of Water Rights in any water rights decision, or state and federal courts.</p> <p>RCD Actions: The Shasta Valley RCD and its CRMP should:</p> <ul style="list-style-type: none"> Assist water diverters in developing and implementing management practices that increase dedicated cold water instream flows in the Shasta River and tributaries. Assist water diverters in developing and implementing a monitoring program to evaluate and document implementation and effectiveness of the actions taken to increase dedicated cold water instream flows in the Shasta River. <p>State Actions: CDFG will:</p> <ul style="list-style-type: none"> Assist water diverters in developing and implementing management practices that increase dedicated cold water instream flows in the Shasta River and tributaries.

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions (cont.)		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
Water Use and Flow (cont.)	<ul style="list-style-type: none"> • CDFG (cont.) • Department of Water Resources (DWR) • Regional Water Board • State Water Resources Control Board (State Water Board) 	<ul style="list-style-type: none"> • Administer the Coho Recovery Strategy and the ITP (when approved). • Assist in developing and implementing a monitoring program to evaluate and document implementation and effectiveness of the actions taken by the water diverters to increase dedicated cold water instream flows in the Shasta River. <p>DWR should:</p> <ul style="list-style-type: none"> • Coordinate and assist water diverters in developing and implementing a monitoring program through a watermaster service to evaluate and document implementation and effectiveness of the actions taken by the water diverters to increase dedicated cold water instream flows in the Shasta River. <p>The Regional Water Board will:</p> <ul style="list-style-type: none"> • Work cooperatively with water diverters, the Shasta Valley RCD and its CRMP, CDFG and DWR, wholly or in part, to establish monitoring and reporting programs to gauge implementation and effectiveness of the actions taken by responsible parties. • If the Executive Officer receives credible evidence that the Shasta River flows are diminishing, the Executive Officer shall promptly report this to the Regional and State Water Board. • If after five years, the Regional Water Board's Executive Officer finds that the above measures have failed to be implemented or are otherwise ineffective, the Regional Water Board may recommend that the State Water Board consider seeking modifications to the decree (<i>In re Waters of Shasta River and its Tributaries</i>, No. 7035 (Super. Ct. Siskiyou County Dec. 29, 1932)), conducting proceedings under the public trust doctrine and/or conducting proceedings under the waste and unreasonable use provisions of the California Constitution and the California Water Code.
<p>Irrigation Control Structures, Flashboard Dams, and other Minor Impoundments</p> <p>(Collectively referred to as minor impoundments)</p>	<ul style="list-style-type: none"> • Individual Irrigators • Irrigation Districts • DWR • Others owning, operating, managing, or anticipating construction of minor impoundments <ul style="list-style-type: none"> • Shasta Valley RCD • Shasta CRMP 	<p>Irrigator(s) Actions: Irrigation districts, individual irrigators, and others that own, operate, manage, or anticipate constructing instream minor impoundments or other structures capable of blocking, impounding, or otherwise impeding the free flow of water in the Shasta River system shall comply with one or more of the following measures:</p> <ul style="list-style-type: none"> • Permanently remove minor impoundments in the Shasta River mainstem. • Re-engineer existing impoundments to decrease surface area of impoundment. • Not construct new impoundments unless they can be shown to have positive effects to the beneficial uses of water relative to water quality compliance and the support of beneficial uses, including the salmonid fishery, in the Shasta Valley. <p>Within one year of EPA approval of the TMDL (by January 26, 2008), report in writing to the Regional Water Board methods and management practices they shall implement that will reduce sediment oxygen demand rates by 50% from baseline behind all minor impoundments.</p> <p>RCD Actions: The Shasta Valley RCD and its CRMP should:</p> <ul style="list-style-type: none"> • Assist in developing and implementing minor impoundment removal, re-engineering or initial design work for compliance with water quality

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions (cont.)		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
Minor impoundments (cont.)	<ul style="list-style-type: none"> • Shasta Valley RCD and Shasta CRMP (cont.) • CDFG • Regional Water Board 	<p>standards, the TMDLs, and the NPS Policy.</p> <ul style="list-style-type: none"> • Implement the recommended actions specified in the Shasta Watershed Restoration Plan and the ITP (when approved). • Assist in developing and implementing a monitoring program to evaluate and document implementation and effectiveness of the actions taken to remove, re-engineer or limit construction of minor impoundments on the mainstem Shasta River. <p>State Actions: CDFG will:</p> <ul style="list-style-type: none"> • Assist in developing and implementing the removal, re-engineering, or limitation on the construction of minor impoundments in the Shasta River mainstem. • Administer the Coho Recovery Strategy and the ITP (when approved). • Assist in the development and implementation of a monitoring program to evaluate and document the implementation and effectiveness of the actions taken to remove, re-engineer, or limit construction of minor impoundments on the mainstem Shasta River. <p>The Regional Water Board will:</p> <ul style="list-style-type: none"> • Work with CDFG to establish monitoring and reporting elements of their programs in order to gage their effectiveness. • Work with the Shasta Valley RCD and its CRMP to establish monitoring and reporting programs to gage the implementation and effectiveness of the Shasta Watershed Restoration Plan. • Include appropriate conditions in Clean Water Act water quality certification permits for minor impoundment removal or re-engineering activities that comply with water quality standards, the TMDL, and the NPS Policy.
Lake Shastina	<ul style="list-style-type: none"> • MWCD • City of Weed • County of Siskiyou • Caltrans • Communities of Lake Shastina • U.S. Forest Service (USFS) • U.S. Bureau of Land Management (BLM) • Private timberland owners 	<p>Within 2 years of EPA approval of the TMDL (by January 26, 2009), the responsible parties shall complete a study of water quality conditions and factors affecting water quality conditions in Lake Shastina, and develop a plan for addressing factors affecting water quality conditions to bring Lake Shastina into compliance with water quality standards, the TMDLs, and the NPS Policy.</p> <p>The study and plan shall be submitted to the Regional Water Board Executive Officer for review, comment and approval. Within 5 years of EPA approval of the TMDL (by January 26, 2012), the responsible parties shall begin implementing the plan.</p>
Dwinnell Dam	<ul style="list-style-type: none"> • Montague Water Conservation District (MWCD) 	<p>Within 2 years of EPA approval of the TMDL (by January 26, 2009), the MWCD shall report in writing to the Regional Water Board on a plan to bring the discharge from Dwinnell Dam into compliance with water quality standards, the TMDLs, and the NPS Policy.</p>

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions (cont.)		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
City of Yreka Wastewater Treatment Facility (Yreka WWTF)	<ul style="list-style-type: none"> • City of Yreka • Regional Water Board 	<p>Yreka Wastewater Treatment Facility Actions: The Yreka WWTF shall comply with existing Regional Water Board Orders and Monitoring and Reporting Programs.</p> <p>Regional Water Board Actions: The Regional Water Board will:</p> <ul style="list-style-type: none"> • Pursue aggressive compliance with Order No 96-69 and CAO No. R1-2004-0037. • Continue vigorous oversight and enforcement of Monitoring and Reporting Program No. R1-2003-0047 to ensure timely submittal of sampling and analytical results from the operators of the Yreka WWTF.
Urban and Suburban Runoff	<ul style="list-style-type: none"> • City of Yreka • City of Weed • City of Montague • Community of Edgewood • Communities of Lake Shastina • Other landowners with suburban runoff • Regional Water Board 	<p>Actions: The cities of Yreka, Weed, Montague, the communities of Lake Shastina, and other landowners with suburban runoff should identify possible pollutants, their sources, and volumes of polluted runoff from urban and suburban sources within their spheres of influence that may discharge, directly or indirectly, to waters of the Shasta River watershed.</p> <p>Cities and other landowners with suburban runoff should implement the applicable measures from the NPS Policy. See Appendix D of this Action Plan for examples of some of these applicable measures.</p> <p>Within two years of EPA approval of the TMDL (by Jan. 2009), cities and landowners with suburban runoff shall develop a plan to minimize, control, and preferably prevent discharges of fine sediment, nutrients and other oxygen consuming materials and elevated temperature waste discharge from affecting waters of the Shasta River and its tributaries. The plan shall be submitted to the Regional Water Board's Executive Officer for review, comment and approval. Within 5 years of EPA approval of the TMDL (by Jan. 2012), cities and landowners with suburban runoff shall begin implementing the plan.</p> <p>State Actions: The Regional Water Board will:</p> <ul style="list-style-type: none"> • Work cooperatively with responsible parties to implement their plan, including appropriate management measures and reasonable time schedules which minimize, control, and preferably prevent discharges of fine sediment, nutrients and other oxygen consuming materials and elevated temperature waste discharge from affecting waters of the Shasta River and its tributaries.
Activities on Federal Lands	<ul style="list-style-type: none"> • USFS 	<p>USFS Actions: The USFS should consistently implement the best management practices for timber harvest activities, grazing, and other activities included in the:</p> <ul style="list-style-type: none"> • <i>Klamath National Forest Land and Resource Management Plan</i> (USFS 1995) or as amended as long as equivalent or better water quality protections are required. • <i>Shasta-Trinity National Forest Land and Resource Management Plan</i> (USFS 1995) or as amended as long as equivalent or better water quality protections are required. • <i>Water Quality Management for Forest System Lands in California, Best Management Practices</i> (USFS 2000) or as amended as long as equivalent or better water quality protections are required. <p>See Appendix E of this Action Plan for some examples of these measures.</p>

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions (cont.)		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
Activities on Federal Lands (cont.)	<ul style="list-style-type: none"> Regional Water Board BLM Regional Water Board 	<p>Regional Water Board Actions: The Regional Water Board will:</p> <ul style="list-style-type: none"> Continue its involvement with the USFS to periodically reassess the mutually agreed upon goals of the 1981 Management Agency Agreement between the SWRCB and the USFS. Work with the USFS to draft and finalize a Memorandum of Understanding (MOU). The MOU shall be drafted and ready for consideration by the appropriate decision-making body of the USFS within two years of EPA approval of the TMDL (by January 26, 2009). The MOU shall include, in part, buffer width requirements and other management practices as detailed in Appendix E. <p>BLM Actions: BLM shall implement best management grazing strategies that are detailed in a joint management agency document titled:</p> <ul style="list-style-type: none"> <i>Riparian Management, TR 1737-14, Grazing Management for Riparian-Wetland Areas, USDI-BLM, USDA-FS (1997).</i> <p>See Appendix F of this Action Plan for some examples of these measures.</p> <p>Regional Water Board Actions: The Regional Water Board will work with the BLM to draft and finalize a Memorandum of Understanding (MOU). The MOU shall be drafted and ready for consideration by the appropriate decision-making body of the BLM within two years of EPA approval of the TMDL (by January 26, 2009). The MOU shall include buffer width requirements and other management practices as detailed in Appendix F of this Action Plan.</p>
Timber Harvest Activities on Non-Federal Lands	<ul style="list-style-type: none"> Private Parties Conducting Timber Harvest Activities California Department of Forestry (CDF) Regional Water Board 	<p>Timber Harvest Related Actions: Parties conducting timber harvest activities should employ land stewardship practices that minimize, control, and preferably prevent discharges of fine sediment, nutrients and other oxygen consuming materials from affecting waters of the Shasta River and tributaries. Landowners should also employ land stewardship practices and activities that minimize, control, and preferably prevent elevated solar radiation loads from affecting waters of the Shasta River and its Class I and II tributaries.</p> <p>State Actions: CDF will:</p> <ul style="list-style-type: none"> Ensure timber operations in the Shasta River watershed are in compliance with the water quality standards, the TMDLs, and NPS Policy. <p>Regional Water Board Actions: The Regional Water Board shall use appropriate permitting and enforcement tools to regulate discharges from timber harvest activities in the Shasta River watershed, including, but not limited to:</p> <ul style="list-style-type: none"> Participation in the CDF timber harvest review and approval process. Use of general or specific WDRs and waivers of WDRs, if applicable, to regulate timber harvest activities on private lands in the Shasta River watershed. Timber harvest activities on private lands in the Shasta River watershed are not eligible for Categorical Waiver C included in the Categorical Waiver of <i>Waste Discharge Requirements for Discharges Related to Timber Harvest Activities on Non-Federal Lands in the North Coast Region</i> (Order No. R1-2004-0016) simply through the adoption of this TMDL Action Plan. However, timber harvest activities on private lands in the Shasta River watershed may be eligible for

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Table 4-14 Shasta River Dissolved Oxygen and Temperature TMDL Implementation Actions (cont.)		
Source or Land Use Activity	Responsible Parties	Actions to Address Dissolved Oxygen and Water Temperature Impairment
Timber Harvest Activities on Non-Federal Lands (cont.)	<ul style="list-style-type: none"> Regional Water Board (cont.) 	<p>Categorical Waivers A, B, D, E, and F, as appropriate.</p> <ul style="list-style-type: none"> If the California Forest Practice Rules (Title 14 CCR Chapters 4, 4.5 and 10) are changed in a manner that reduces water quality protections, the Regional Water Board shall require plan submitters to maintain the level of water quality protection provided by the 2006 Forest Practice Rules. <p>See Appendix G of this Action Plan for select examples of 2006 Forest Practice Rules.</p>
California Department of Transportation Activities (Caltrans)	<ul style="list-style-type: none"> Caltrans Regional Water Board 	<p>Caltrans Actions: Caltrans shall implement the requirements of its stormwater program.</p> <p>Regional Water Board Actions: Regional Water Board shall:</p> <ul style="list-style-type: none"> Within two years of EPA approval of the TMDL (by January 26, 2009), complete an initial evaluation of the Caltrans Stormwater Program. After the initial two-year evaluation is completed, the Regional Water Board shall continue periodic reviews of the program to assure ongoing compliance.

IX. Glossary

Adjusted Potential Effective Shade:

The percentage of direct beam solar radiation attenuated and scattered before reaching the ground or stream surface from the potential vegetation conditions, reduced by 10% to account for natural disturbance such as fire, windthrow, disease, and earth movements that reduce actual riparian vegetation below the site potential.

Biochemical Oxygen Demand (CBOD):

An analytical method used as an indicator for the concentration of biodegradable organic matter present in a sample of water. It measures the rate of uptake of oxygen by micro-organisms in the sample of water over a given period of time, and can be used to infer the general quality of the water and its degree of pollution.

Carbonaceous Deoxygenation:

Refers to the consumption of oxygen by bacteria during the breakdown of (decomposition) of organic (carbon-containing) material.

Class I Tributary:

This watercourse must have one of the following properties in order to be considered a Class I tributary, according to California Forest Practice Rules: (1) domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area, and/or (2) fish are always or seasonally present onsite, includes habitat to sustain fish migration and spawning.

Class II Tributary:

This watercourse must have one of the following properties in order to be considered a Class II tributary, according to California Forest Practice Rules: (1) fish always or seasonally present offsite within 1000 feet downstream, (2) is an aquatic habitat for nonfish aquatic species, and/or (3) excludes Class III waters that are tributary to Class I waters.

Compliance and Trend Monitoring:

Monitoring intended to determine, on a watershed scale, if water quality standards are being met, and to track progress towards meeting water quality standards.

Dedicated Cold Water Instream Flow:

Water remaining in the stream in a manner that the diverter, either individually or as a group, can ensure will result in water quality benefits. Temperature, length, and timing are factors to consider when determining the water quality benefits of an instream flow.

Implementation Monitoring:

Monitoring used to assess whether activities and control practices were carried out as planned. This type of monitoring can be as simple as photographic documentation, provided that the photographs are adequate to represent and substantiate the implementation of control practices.

Instream Effectiveness Monitoring:

Monitoring of instream conditions to assess whether pollution control practices are effective at keeping waste from being discharged to a water body. Instream effectiveness monitoring may be conducted upstream and downstream of the discharge point or before, during, and after the implementation of pollution control practices.

Irrigation Return Flows:

See Tailwater Return Flow.

Natural Potential Vegetation Conditions:

The most advanced seral stage that nature is capable of developing and making actual at a site in the absence of human interference. Seral stages are the series of plant communities that develop during ecological succession from bare ground to the climax community (e.g., fully mature, old-growth).

Nitrification:

The oxidation of an ammonium (NH_4^+) compound to nitrite (NO_2^-) and nitrate (NO_3^-), a process that consumes oxygen.

Nitrogenous Deoxygenation:

The conversion of organic nitrogen to ammonium (NH_4^+) and the subsequent oxidation of ammonium to nitrite (NO_2^-) and then to nitrate (NO_3^-), a process that consumes oxygen

Nitrogenous Biochemical Oxygen Demand (NBOD):

A measure of the amount of oxygen consumed from the conversion of organic nitrogen to ammonium (NH_4^+) and the oxidation of ammonium to nitrite (NO_2^-) and subsequently (NO_3^-).

Nitrogenous Oxygen Demand:

The conversion of organic nitrogen to ammonium by bacteria, a process that consumes oxygen.

Potential Effective Riparian Shade:

That shade resulting from topography and natural potential vegetation that reduces the heat load reaching the stream. The difference between existing (baseline) and adjusted potential effective shade reflects the amount of effective riparian shade increase (i.e. reduced solar transmittance) that is necessary to achieve natural receiving water temperatures.

Potential Solar Radiation Transmittance:

Potential solar radiation transmittance is the amount of solar radiation that passes through the vegetation canopy and reaches the water surface, when natural potential vegetation conditions are achieved.

Reaeration:

The process whereby atmospheric oxygen is transferred to a waterbody.

Salmonids:

Fish species in the family Salmonidae, including but not limited to: salmon, trout, and char.

Sediment:

Any inorganic or organic earthen material, including, but not limited to: soil, silt, sand, clay, peat, and rock.

Sediment Oxygen Demand (SOD):

The consumption of oxygen by sediment and associated organisms (such as bacteria and invertebrates) through both the decomposition of organic matter and respiration by plants, bacteria, and invertebrates.

Solar Radiation Transmittance:

Solar radiation transmittance is defined as the amount of solar radiation that passes through the vegetation canopy and reaches the water surface. A value of 1.0 represents no shade; a value of 0.0 represents complete shade.

Tailwater Return Flow:

Water applied to a field for irrigation at rates that exceed soil infiltration and evaporation rates, resulting in runoff of irrigation water to a surface water body. Same as Irrigation Return Flows.

Water Quality Compliance Model Scenario:

A computer water quality model scenario developed by Regional Water Board staff that characterizes Shasta River watershed conditions under which the Basin Plan narrative temperature objective and numeric dissolved oxygen are met in the Shasta River.

CHAPTER 4. IMPLEMENTATION

Shasta River TMDL Action Plan - Appendix A

<p align="center">Range and Riparian Land Management Measures</p>
<p>(1) Protect sensitive areas (including streambanks, lakes, wetlands, estuaries, and riparian zones) by (a) excluding livestock, (b) providing stream crossings or hardened access to watering areas, (c) providing alternative water locations away from surface water, (d) locating salt and additional shade, if needed, away from sensitive areas, or (e) use improved grazing management (e.g. herding) to reduce the physical disturbance and direct loading of animal waste and sediment caused by livestock; and (2) Achieve the following on range, pasture and other grazing lands not addressed under (1) above: implement the range and pasture components of a Resource Management Systems (RMS) as defined in the United States Department of Agriculture (USDA) Natural Resource CS Field Office Technical Guide applying the progressive planning approach of the USDA NRCS to reduce erosion. NPS Policy (MM 1E) (SWRCB, 2004)</p>
<p>On properties owned by participants in the ITP, livestock fencing shall be in place on at least 90% of that person's owned stream bank length where there is a potential to affect coho, or fencing shall be in active progress towards implementation along those streams with installation by January 1, 2008, and/or shall have CDFG approved livestock management measures in place that will provide similar protections to the streambanks and riparian zone. Livestock riparian exclusion fencing built after 3-30-05 needing to comply with the permit must be approved by SVRCD, will be expected to have a setback of at least 35 feet from normal high water line, and shall be maintained in good working order as long as the permit is in place and livestock are present. Draft Shasta ITP (Minimization Measures B) (RCD, 2005)</p>
<p>SVRCD will work with landowners and DFG on appropriate methodology and riparian species selection on a site by site basis. Draft Shasta ITP (Minimization Measures C) (RCD, 2005)</p>
<p>Grazing along the steam corridor may occur as a mechanism of riparian management and will be coordinated with the SVRCD, the landowners and CDFG staff. Draft Shasta ITP (Table 1-1) (RCD, 2005)</p>
<p>Planting of riparian vegetation along stream banks will be coordinated with the SVRCD, the landowners and CDFG staff. Draft Shasta ITP (Table 1-1) (Table 1-1) (RCD, 2005)</p>
<p>Address factors that contribute to high temperatures. Coho Recovery Strategy (HM-5a, b) (CDFG, 2004)</p>
<p>Promote coho salmon recovery by minimizing diversion entrainment, protecting riparian vegetation, and encouraging effective land use practices. Coho Recovery Strategy (P-1 through P-7) (CDFG, 2004)</p>
<p>Increase riparian vegetation. Coho Recovery Strategy (HM-4a-d) (CDFG, 2004)</p>
<p>Continue program of riparian fencing and native tree planting. Shasta Watershed Restoration Plan (SRCRMP, 1997)</p>

CHAPTER 4. IMPLEMENTATION

Shasta River TMDL Action Plan - Appendix B

Tailwater Return Flow Management Measures
Develop and implement comprehensive nutrient management plans for areas where nutrient runoff is a problem affecting coastal waters and/or water bodies listed as impaired by nutrients. Such plans would include a plant tissue analysis to determine crop nutrient needs; crop nutrient budget; identification of the types, amounts, and timing of nutrients necessary to produce a crop based on realistic crop yield expectations; identification of hazards to the site and adjacent environment; soil sampling and tests to determine crop nutrient needs; and proper calibration of nutrient equipment. When manure from confined animal facilities is to be used as a soil amendment and/or is disposed of on land, the plan shall discuss steps to assure that subsequent irrigation of that land does not leach excess nutrients to surface or ground water. NPS Policy (MM 1C) (SWRCB, 2004)
Capture of additional tailwater from on-site or neighboring fields. Draft Shasta ITP (Table 1-1) (RCD, 2005)
The Shasta RCD will assist landowners/sub-permittees in designing and implementing tailwater capture systems that intercepts and reuses runoff from on-site and off-site properties in accordance to standards outlined by the NRCS. Draft Shasta ITP (Table 1-1) (RCD, 2005)
Conduct assessments of tailwater return flows, promote opportunities to eliminate, minimize, reclaim and reuse, where feasible. Coho Recovery Strategy (WUE-7a-c) (CDFG, 2004)
Manage tailwater return flows so that entrained constituents, such as fertilizers, fine sediment and suspended organic particles, and other oxygen consuming materials are not discharged to nearby watercourses. This could include modifications to irrigation systems that reuse tailwater by constructing off-stream retention basins, active (pumping) and or passive (gravity) tailwater recapture/redistribution systems. (U.C. Davis 1998; NRCS 1997)
Seek ways to reduce irrigation tailwater, or capture for reuse. Shasta Watershed Restoration Plan (SRCRMP, 1997)

CHAPTER 4. IMPLEMENTATION

Shasta River TMDL Action Plan - Appendix C

Instream Flow Management Measures
<p>Promote effective irrigation while reducing pollutant delivery to surface and ground waters. Pursuant to this measure, irrigation water would be applied uniformly based on an accurate measurement of cropwater needs and the volume of irrigation water applied, considering limitations raised by such issues as water rights, pollutant concentrations, water delivery restrictions, salt control, wetland, water supply and frost/freeze temperature management. Additional precautions would apply when chemicals are applied through irrigation. NPS Policy (MM 1F) (SWRCB, 2004)</p>
<p>All persons covered by the permit and diverting water from within the Shasta River watershed will be expected to support ongoing watermaster services (either by DWR or by some other entity should DWR cease to provide service) and pay their proportionate cost of that service to provide watermaster service in the Shasta Valley between April 1 and October 1 when instream flows are likely to be most critical to coho. Individual proportional costs for this activity are expected to continue to be collected by the County of Siskiyou via annual property taxes. Those participants exercising riparian rights and not subject to watermaster control will cooperate with the watermaster in assuring they are within their legal rights and will inform the watermaster of any changes in the quantities of water they will be diverting. Draft Shasta ITP (Avoidance Measures III. A. i.) (RCD, 2005)</p>
<p>DFG, DWR and the SVRCD shall develop and implement a management plan to coordinate and monitor irrigation season start up so as to minimize rapid deductions in instream flows. A draft Ramped Diversion Plan will be submitted to DFG by January 1, 2007 with a finalized plan submitted by January 1, 2008. Draft Shasta ITP (Avoidance Measures III. A. ii.) (RCD, 2005)</p>
<p>All persons covered by the ITP shall endorse continued efforts by DWR or other private watermaster organizations, to assure that flows year round shall not be allowed to fall below 20 cfs at the Shasta River near Montague (SRM) gage, a quantity that has been historically the watermaster's minimum target for flow at that location, nor that flows at A-12 shall fall below 45 cfs at any time during the summer, a quantity that will assure that substantial cold water refugia areas are retained upstream of the point. Draft Shasta ITP (Avoidance Measures III. A. iii.) (RCD, 2005)</p>
<p>The SVRCD will develop a dry and critically dry year plan to assure that stranding, or elimination of needed cold water refugia areas does not occur during extremely dry years. The dry year plan will be developed by SVRCD and will insure that previously described flows at 50 cfs at A-12 and 20 cfs at Montague-Grenada Road are achieved. A draft Dry Year Plan will be completed by the SVRCD one year from the issuance of the permit. Draft Shasta ITP (Avoidance Measures III. F) (RCD, 2005)</p>
<p>The SVRCD will work with those entities seeking coverage under the ITP to assist them in their efforts to upgrade overall irrigation efficiency. Potential projects that may be implemented to improve flows include upgrade of water delivery systems to reduce waste, upgrade of water application systems, monitoring crop water requirements vs. soil moisture, etc. Draft Shasta ITP (Minimization Measures V. A. i.) (RCD, 2005)</p>
<p>Encourage the Shasta CRMP to develop a dry year water plan for the Shasta River. Shasta Coho Recovery Strategy (WM-1a) (CDFG, 2004)</p>
<p>Add additional oversight and more people to verify water use and better manage water in current watermaster service areas. Coho Recovery Strategy (WM-2a) (CDFG, 2004)</p>
<p>Institute a cooperative agreement between diverters to stage/stagger their irrigation starts and completions (ramped flows) to gradually change flows over several days. Coho Recovery Strategy (WM-3a) (CDFG, 2004)</p>
<p>CRMP, CDFG, and voluntary landowner participation: agree to pull diversions for a limited time period to produce a pulsed flow downstream. Coho Recovery Strategy (WM-4a)</p>

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Instream Flow Management Measures
Determine unused diversion rights and approach those diverters about providing flows for instream use without affecting the water rights of others. Coho Recovery Strategy (WM-5c) (CDFG, 2004)
For critical streams/reaches, diverters could rotate irrigations so diversions do not coincide when increased flows are critical for fish. Coho Recovery Strategy (WM-6a)
Provide headgates and measuring devices for diversions located in riparian areas. Coho Recovery Strategy (WM-7a) (CDFG, 2004)
Study and forecast correlation of stream flow with other parameters to predict weekly flow rates. Can be based on snow surveys, precipitation, aquifer condition, etc. Coho Recovery Strategy (WM-8b) (CDFG, 2004)
Seek funding to conduct instream flow studies to determine flow-habitat relationships. Coho Recovery Strategy (WM-9) (CDFG, 2004)
Provide a structured process for willing participants to donate, sell, or lease water rights to provide improved stream flow. Coho Recovery Strategy (WA-1b, c, d & WA-7a, b, c) (CDFG, 2004)
Acquire water rights that shall be dedicated to instream flow. Coho Recovery Strategy (WA-7) (CDFG, 2004)
Support preparation of a water balance study. Apply study results to water management, augmentations, and Habitat enhancement recommendations. Coho Recovery Strategy (WM-1b) (CDFG, 2004)
Study feasibility of building storage reservoirs to capture excess winter runoff (solely) for the benefit of coho salmon, not for irrigation augmentation. Coho Recovery Strategy (WA-2a & WA-3b) (CDFG, 2004)
Identify and prioritize benefits and/or detriments to lining/piping surface ditch systems; promote ongoing diversion ditch maintenance. Coho Recovery Strategy (WUE-3; WUE-4) (CDFG, 2004)
Promote and/or retain water efficient irrigation practices. Coho Recovery Strategy (WUE-5a-e) (CDFG, 2004)
Prepare a comprehensive groundwater study to determine the current status of groundwater in the Shasta Valley and its relationship to surface flows. Coho Recovery Strategy (WM-10a) (CDFG, 2004)
Continue pulsed flow program to flush salmonids downstream during lethal water temperature conditions. Shasta Watershed Restoration Plan (I B-2) (SRCRMP, 1997)
Support creation of dedicated instream flows for fish and wildlife. Shasta Watershed Restoration Plan (I B-2) (SRCRMP, 1997)
Contemplate the impacts of readjudication of both surface and ground water. Shasta Watershed Restoration Plan (I B-9) (SRCRMP, 1997)
Continue pulse flows until water quality is improved. Shasta Watershed Restoration Plan (III B-3.e) (SRCRMP, 1997)
Seek funding for purchase of water for instream flows from willing sellers. Shasta Watershed Restoration Plan (III B-6) (SRCRMP, 1997)
Where other means of adequate protection (for fish) are unlikely, support the purchase of key (property) areas from voluntary sellers whose sale would protect remaining land uses in the Shasta Valley. Shasta Watershed Restoration Plan (III B-7) (SRCRMP, 1997)

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Shasta River TMDL Action Plan - Appendix D

Urban and Suburban Runoff Management Measures
<p>Develop a watershed protection program to</p> <ol style="list-style-type: none">1. Avoid conversion, to the extent practicable, of areas that are particularly susceptible to erosion and sediment loss;2. Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota;3. Protect to the extent practicable the natural integrity of water bodies and natural drainage systems associated with site development – including roads, highways and bridges;4. Limit increases of impervious surfaces; and5. Provide education and outreach to address NPS pollution. <p>NPS Policy (MM 3.1A) (SWRCB, 2004)</p>
<p>Plan, design and develop sites to:</p> <ol style="list-style-type: none">1. Protect areas that provide important water quality benefits necessary to maintain riparian and aquatic biota, and/or are particularly susceptible to erosion or sediment loss;2. Limit increase in impervious areas;3. Limit land disturbance activities such as clearing and grading and cut and fill to reduce sediment loss; and4. Limit disturbance of natural drainage features and vegetation. <p>NPS Policy (MM 3.1B) (SWRCB, 2004)</p>
<p>By design or performance:</p> <ol style="list-style-type: none">1. After construction has been completed and the site is permanently stabilized, reduce the average total suspended solids (TSS) loading by 80 percent (for purposes of this measure, an 80 percent TSS reduction is to be determined on an average annual basis); or2. Reduce the post-development loading of TSS so that the average annual TSS loadings are no greater than pre-development loadings.3. To the extent practicable, maintain post-development peak runoff rate and average volume at levels similar to pre-development levels. <p>NPS Policy (MM 3.1C) (SWRCB, 2004)</p>
<ol style="list-style-type: none">1. Limit application, generation, and mitigation of toxic substances;2. Ensure the proper storage and disposal of toxic materials;3. Apply nutrients at rates necessary to establish and maintain vegetation without causing nutrient runoff to surface waters; and4. Prepare and implement, prior to the use or storage of toxic material on site, an effective, approved chemical control plan or similar administrative document that contains chemical control provisions (e.g. minimize use of toxic materials; ensure proper containment if toxic materials are to be used /stored on site). <p>NPS Policy (MM 3.2.B) (SWRCB, 2004)</p>
<p>Develop and implement watershed management programs to reduce runoff pollutant concentrations and volumes from existing development:</p> <ol style="list-style-type: none">1. Identify priority local and/or regional watershed pollutant reduction opportunities (e.g. improve existing urban runoff control structures);2. Specify a schedule for implementing appropriate controls;3. Limit destruction of natural conveyance systems; and4. Where appropriate, preserve, enhance, or establish buffers along surface waters and their tributaries. <p>NPS Policy (MM 3.3A) (SWRCB, 2004)</p>

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Shasta River TMDL Action Plan - Appendix E

Recommended Interim Riparian Reserve Widths for Klamath National Forest and Shasta-Trinity National Forest Lands in the Shasta River Watershed¹

RIPARIAN RESERVE TYPE	Riparian Reserve Widths
Fish-bearing streams.	Include the stream and: area on each side from active channel edges to the top of inner gorge, or outer edge of 100 year flood plain, or to outer edge of riparian vegetation, or height of two site potential trees ² , or 300 feet slope distance, whichever is greatest.
Perennial, non-fish bearing streams	Include the stream and: area on each side from active channel edges to the top of inner gorge, or outer edge of 100 year flood plain, or outer edge of riparian vegetation, or height of one site potential tree ² , or 150 feet slope distance, whichever is greatest.
Lakes and natural ponds	Include the body of water and: area to the outer edge of riparian vegetation, or extent of seasonally saturated soil, or extent of unstable and potentially unstable areas, or height of one site potential tree ² , or 300 feet slope distance, whichever is greatest.
Constructed ponds, reservoirs and wetlands >1-acre in size	Include the body of water or wetland and: area to outer edges of riparian vegetation, or to seasonally saturated soil, or the extent of unstable and potentially unstable areas, or distance of one site potential tree, or 150 feet slope distance from wetland edge >1 acre, or the maximum pool elevation of constructed ponds, reservoirs, whichever is greatest.
Seasonally flowing or intermittent streams ³ wetlands <1-acre in size, and unstable or potentially unstable areas	At a minimum include: extent of unstable and potentially unstable areas (includes earthflows), stream channel and extend to top of inner gorge, stream channel or wetland and area from the edges of the stream channel or wetland to outer edges of riparian vegetation, and extension from edges of stream channel to height of one site potential tree ² , or 100 feet slope distance, whichever is greatest.

¹ Information from the Land and Resource Management Plans for the Klamath and Shasta-Trinity National Forests, Klamath National Forest LRMP (1995), Shasta-Trinity National Forest LRMP (1995).

² Site potential tree, depending on site class, is an average maximum height of the tallest dominant tree, ≥ 200 years old.

³ Intermittent stream defined as any nonpermanent flowing drainage feature with a definable channel having evidence of annual scour or deposition, includes ephemeral streams meeting these physical criteria.

Grazing Standards and Guidelines for Shasta-Trinity and Klamath National Forests
Adjust grazing practices to eliminate impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives. If adjusting practices is not effective, eliminate grazing
Locate new livestock handling and/or management facilities outside Riparian Reserves. For existing livestock handling facilities inside the Riparian Reserve, ensure that Aquatic Conservation Strategy objectives are met. Where these objectives cannot be met, require relocation or removal of such facilities.
Limit livestock trailing, bedding, watering, loading, and other handling efforts to those areas and times that will ensure Aquatic Conservation Strategy objectives are met.

From Shasta - Trinity LRMP

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Shasta River TMDL Action Plan - Appendix F

BLM Grazing Management Measures
Grazing management must provide an adequate cover and height of vegetation on the banks and overflow zones to promote natural stream function (sediment filtering, bank building, flood energy dissipation, aquifer recharge and water storage).
Control the timing of grazing to prevent damage to streambanks when they are most vulnerable to trampling.
Ensure sufficient vegetation during periods of high flow to protect streambanks, dissipate energy, and trap sediment.
Techniques that restrict livestock from riparian areas, including fencing or fence relocation, barriers such as thickets or brush wind rows, water gaps in erosion-resistant stream reaches, hardened crossings or water access, and relocation of bed grounds and management facilities.
Riparian Management, TR 1737-14 1997, Grazing Management for Riparian-Wetland Areas, USDI-BLM, USDA-FS

Shasta River TMDL Action Plan - Appendix G

Examples of Select Management Measures for Timber Harvest Activities on Non-federal Lands from the 2006 California Forest Practice Rules
Every timber operation shall be planned and conducted to prevent deleterious interference with watershed conditions that primarily limit the values set forth in “the rules” (e.g. sediment load increase where sediment is the limiting factor, thermal load increase where water temperature is the primary limiting factor, etc). Section 916.9, 936.9 (a)
Comply with the terms of a Total Maximum Daily Load that has been adopted to address factors that may be affected by timber operations, if a TMDL has been adopted, or not result in any measurable sediment load increase to watercourses of lakes. Section 916.9, 936.9 (a) (1)
Not result in any measurable stream flow reduction during critical low water periods except as part of an approved water drafting plan. Section 916.9, 936.9 (a) (4)
Protect maintain and restore the quality and quantity of vegetative canopy needed to: (a) provide shade to the watercourse or lake, (b) minimize daily and seasonal temperature fluctuations, and (c) maintain daily and seasonal temperature within the preferred range for anadromous salmonids. Section 916.9, 936.9 (a) (6)
Any timber operations or silvicultural prescriptions within 150 feet of any Class I watercourse or lake transition line or 100 feet of any Class II watercourse or lake transition line shall have protection, maintenance, or restoration of beneficial uses of water or the populations and habitat of anadromous salmonids or listed aquatic or riparian-associated species as significant objectives. Section 916.9, 936.9 (c)
The minimum WLPZ width for Class I waters shall be 150 feet from the watercourse or lake transition line. Section 916.9, 936.9 (f)
Within a WLPZ for Class I waters, at least 85 percent overstory canopy shall be retained within 75 feet of the watercourse or lake transition line. Section 916.9, 936.9 (g)

4.2.11 Action Plan For The Klamath River Total Maximum Daily Loads Addressing Temperature, Dissolved Oxygen, Nutrient, And Microcystin Impairments In The Klamath River In California And Lost River Implementation Plan²⁴

The Klamath River Basin in California, including all tributaries, comprises approximately 12,680 square miles (7,414,761 acres) and is located in Del Norte, Humboldt, Trinity, Siskiyou, and Modoc Counties.

This *Action Plan for the Klamath River* includes temperature, dissolved oxygen, nutrients, organic matter, and microcystin total maximum daily loads (TMDLs) for the Middle and Lower Hydrologic Areas of the Klamath River, and references the Lower Lost River TMDLs established by the United States Environmental Protection Agency (USEPA).

The Action Plan also contains an implementation plan applicable to actions within the entire Klamath River Basin (or watershed) in California, including the Lost River watershed. The implementation actions are necessary to achieve the TMDLs and attain temperature, dissolved oxygen, biostimulatory substances, and toxicity water quality standards, including the protection and restoration of the beneficial uses of water in the Klamath River Basin. The Klamath River TMDL Action Plan sets out the loads and conditions to be considered and incorporated into regulatory and non-regulatory actions in the Klamath River Basin. The Lost River Implementation Plan sets out the conditions to be considered and incorporated into regulatory and non-regulatory actions in the Lost River basin.

I. Problem Statement

In 1996, the Klamath River mainstem was listed as impaired for organic enrichment/low dissolved oxygen (DO) from Iron Gate Reservoir to the Scott River, and for nutrient and temperature impairment in the remainder of the basin pursuant to section 303(d) of the Clean Water Act. In 1998, the Klamath River watershed was listed for nutrient and temperature impairment from Iron Gate Reservoir to the Scott River, and the Klamath River mainstem was listed for organic enrichment/low dissolved oxygen in the reaches upstream of Iron Gate Reservoir and downstream of the Scott River. Iron Gate and Copco Reservoirs and the intervening reach of the Klamath River were listed for the blue-green algae toxin microcystin impairment in 2006. The 303(d) listings were confirmed in the Klamath River TMDL analysis.

Dissolved oxygen concentrations are regularly too low to comply with the Basin Plan dissolved oxygen objectives. Water temperature conditions regularly exceed temperature thresholds protective of salmonids. Low dissolved oxygen concentrations and elevated water temperatures in the Klamath River, its tributaries, Copco 1 and Copco 2, and Iron Gate Reservoirs, and seasonal algae blooms have resulted in degraded water quality conditions that do not meet applicable water quality objectives and that impair designated beneficial uses. The designated beneficial uses that are not fully supported include: cold freshwater habitat (COLD); rare, threatened, and endangered species (RARE); migration of aquatic organisms (MIGR); spawning, reproduction, and/or early development of fish (SPWN); commercial and sport fishing (COMM); Native American cultural use (CUL); subsistence fishing (FISH); and contact and non-contact water recreation (REC-1 and REC-2).

The designated beneficial uses associated with the cold freshwater salmonid fishery (COMM, COLD, RARE, MIGR, and SPWN) and Native American cultural use and subsistence fishing (CUL and FISH) are interrelated and are the designated beneficial uses most sensitive to the water quality impairments of the Klamath River. Important species in the Klamath River watershed include coho and Chinook salmon, trout, green sturgeon, eulachon, and Pacific lamprey.

II. Watershed Restoration Efforts

Throughout the Klamath River watershed in California, many individuals, groups, and agencies have been working to enhance and restore fish habitat and water quality. These groups include, but are not limited to the United States Forest Service (USFS), the United States Fish and Wildlife Service, NOAA-Fisheries, the United States Bureau of Reclamation (USBR), the Natural Resource Conservation Service, the Klamath

²⁴ Adopted by the North Coast Regional Water Quality Control Board on March 24, 2010. Approved by the State Water Resources Control Board on September 7, 2010. Approved by the State Office of Administrative Law on December 7, 2010. Approved by the United States Environmental Protection Agency on December 28, 2010.

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River Basin Fisheries Task Force, the California Department of Fish and Game (CDFG), the California Department of Water Resources, the Klamath Tribe, Hoopa Valley Tribe, Karuk Tribe, and Yurok Tribe, the Quartz Valley Indian Reservation, the Resighini Rancheria, the Five Counties Salmonid Conservation Program, local Resource Conservation Districts, local and national environmental and conservation groups, local irrigation districts, local watershed groups, and private timber companies. Their past and present efforts have improved water quality conditions in the Klamath River and its tributaries.

On February 18, 2010, participants in the Klamath settlement process signed the Klamath Basin Restoration Agreement (KBRA) and Klamath Hydroelectric Settlement Agreement (KHSA). The KBRA is intended to result in effective and durable solutions which will: 1) restore and sustain natural fish production and provide for full participation in ocean and river harvest opportunities of fish species throughout the Klamath Basin; 2) establish reliable water and power supplies which sustain agricultural uses, communities, and National Wildlife Refuges; and 3) contribute to the public welfare and the sustainability of all Klamath Basin communities.

The KHSA lays out the process for additional studies, environmental review, and a decision by the Secretary of the Interior (Secretarial Determination) regarding whether removal of four dams owned by PacifiCorp: 1) will advance restoration of the salmonid fisheries of the Klamath Basin; and 2) is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and tribes. The four dams are Iron Gate, J.C. Boyle, Copco 1 and Copco 2 dams on the Klamath River. The KHSA includes provisions for the interim operation of the dams and the process to transfer, decommission, and remove the dams (Summary of Klamath Basin Settlement Agreements, 2010).

III. Temperature

A. Klamath River Temperature Source Analysis

The Klamath River Watershed Temperature TMDL addresses the heat loads that arise from seven sources:

1. Conditions of Klamath River water crossing the Oregon-California border (Stateline).
2. Thermal discharges from Copco 2 and Iron Gate Reservoirs.
3. The impoundment of water in the Copco 1, Copco 2, and Iron Gate Reservoirs.
4. Temperature effects of Iron Gate Hatchery.
5. Temperature effects of major tributaries on Klamath River temperatures.
6. Effects of excess solar radiation.
7. Effects of excess²⁵ (anthropogenic) sediment loads.

B. Klamath River Temperature TMDL

The Klamath River Temperature TMDL is set equal to the loading capacity. The loading capacity is the maximum amount of pollutant loading that can occur while still achieving water quality objectives and protecting beneficial uses. For the temperature TMDL the water quality objective of concern is the temperature objective, which prohibits the alteration of the natural receiving water temperature unless such alteration does not adversely affect beneficial uses. The loading capacity provides a reference for calculating the amount of pollutant load reduction needed to bring a water body into compliance with standards. The starting point for the load allocation analysis is the equation that describes the total maximum daily load or loading capacity:

$$\text{TMDL} = \text{Loading Capacity} = \Sigma\text{WLAs} + \Sigma\text{LAs} + \text{Natural Background} + \text{MOS}$$

²⁵ Excess sediment is defined herein as soil, silt, sand, clay or other similar material rock, and/or sediments (e.g. sand silt, sand, or clay) discharged to waters of the state in an amount that could be deleterious to beneficial uses or cause a nuisance.

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where Σ = the sum, WLAs = waste load allocations, LAs = load allocations, and MOS = margin of safety. Waste load allocations are contributions of a pollutant from point sources, while load allocations are contributions from human-caused (anthropogenic) nonpoint sources.

This TMDL allocates no temperature increases year-round, thus the load and waste load allocations are zero, and the Temperature TMDL is:

Temperature TMDL
= Loading Capacity
= 0 increase over natural temperatures²⁶
= 0 anthropogenic heat load at Stateline
+ 0 heat load discharge from Copco 2 and Iron Gate Reservoirs
+ 0 heat load discharge from Iron Gate Hatchery
+ 0 heat load discharge from tributaries
+ 0 heat load from excess solar radiation
+ 0 heat load from anthropogenic sediment loads
+ natural background
= natural background

C. Klamath River Temperature Load Allocations

In accordance with the Clean Water Act, the Klamath River Temperature TMDL is allocated to the sources of elevated temperature in the watershed. The Iron Gate Fish Hatchery is the one point-source heat load in the Klamath River watershed. The interstate water quality objective for temperature prohibits the discharge of thermal waste to the Klamath River, and therefore the waste load allocation for Iron Gate Hatchery is set to zero, as monthly average temperatures. The TMDL addresses elevated temperatures from natural and nonpoint anthropogenic sources. The nonpoint sources include: (1) excess solar radiation, expressed as its inverse, shade; (2) heat loads associated with increased sediment loads; (3) heat loading from impoundments; and (4) heat loads from Oregon. The assigned load allocations for temperature are expressed in Table 4-15.

D. Klamath River Temperature Margin of Safety, Seasonal Variations, and Critical Conditions

The Klamath River Temperature TMDL for California relies on an implicit margin of safety. The intrastate water quality objective for temperature allows for temperature increases of up to 5°F if beneficial uses of water are not adversely affected. For much of the year the instream temperature of the Klamath River is too hot to accommodate more heat loading without beneficial uses of water being adversely affected. There are periods in the winter and spring months, however, when temperature increases of up to 5°F may occur without beneficial uses of water being adversely affected. The timing of those periods predict. Therefore, this TMDL takes a conservative approach, allocating no temperature increases year-round. This conservative approach constitutes an implicit margin of safety.

To account for annual and seasonal variability, the Klamath River Temperature TMDL analysis evaluated temperatures and thermal processes throughout the calendar year. The seasonal variability is accounted for in the load allocations for temperature, described above, which do not allow for temperature increases during any part of the year. changes from year to year and is difficult to predict. Therefore, this TMDL takes a conservative approach, allocating no temperature increases year-round. This conservative approach constitutes an implicit margin of safety.

To account for annual and seasonal variability, the Klamath River Temperature TMDL analysis evaluated temperatures and thermal processes throughout the calendar year. The seasonal variability is accounted for in the load allocations for temperature, described above, which do not allow for temperature increases during any part of the year.

²⁶ Natural temperatures are those water temperatures that exist in the absence of anthropogenic influences, and are equal to natural background.

IV. Dissolved Oxygen

A. Klamath River Dissolved Oxygen Source Analysis

The Klamath River dissolved oxygen (DO) source analysis quantified nutrient and organic matter pollutant loads from fourteen geographic areas or entities (called “source areas”) within the Klamath River Basin. Each source area has a different combination of source categories - processes at work which contribute to the load from that source area. The geographic source areas are generally grouped as follows:

- Stateline: Waters entering California from Oregon at Stateline, which includes the Williamson and Sprague River watersheds, Upper Klamath Lake, the Lost River watershed that drains the USBR’s Klamath Project and includes one municipal point source in California, municipal and industrial point sources to the Klamath River in Oregon, and Klamath River waters passing through Keno and JC Boyle Reservoirs. Oregon’s Klamath River TMDL source analysis evaluates the contributions from these discrete sources on the water quality of the Klamath River in Oregon.
- Klamath Hydroelectric Project facilities in California: Copco 1 and 2 and Iron Gate Reservoirs – Copco 1 and 2 Reservoirs are treated as a single source for the purposes of this TMDL.
- Iron Gate Hatchery.
- Tributaries: Four individual rivers (Shasta, Scott, Salmon, and Trinity rivers) are included as discrete source areas, while groups of smaller creeks are combined into six additional source areas (Stateline to Iron Gate Dam reach tributaries, Iron Gate Dam to Shasta River, Shasta River to Scott River, Scott River to Salmon River, Salmon River to Trinity River, and Trinity River to Turwar Creek).

Table 4-15: Temperature Load Allocations²⁷

Source	Allocation
Excess Solar Radiation (expressed as effective shade)	The shade provided by topography and full potential vegetation conditions at a site, with an allowance for natural disturbances such as floods, wind throw, disease, landslides, and fire.
Increased Sediment Loads	Zero temperature increase caused by substantial human-caused sediment-related channel alteration. ²⁸
Impoundment Discharges	Zero temperature increase above natural temperatures. ²⁹
Reservoirs	See dual temperature - dissolved oxygen allocation, below in Section IV. C.
Klamath River at Stateline	Zero increase above natural temperatures.

B. Klamath River Dissolved Oxygen TMDL

The TMDLs addressing dissolved oxygen and nutrient-related water quality impairments, including microcystin, are closely interrelated because of the strong relationship between biostimulatory conditions, decomposition of organic matter, and resulting dissolved oxygen conditions. The Klamath River TMDLs for California are calculated to attain and maintain Site Specific Objectives (SSOs) for DO in the Klamath River in California. The SSOs for DO and associated DO load allocations are the primary driver in establishing the nutrient and organic matter loading capacity for the river reaches of the Klamath River in California. Stateline and tributary allocations for the nutrients (total nitrogen (TN) and total phosphorus (TP)) and

²⁷ These allocations are assigned to the Klamath River Middle and Lower Hydrologic Areas. Major tributaries are not assigned temperature allocations because the Scott, Shasta and Salmon River watersheds already have assigned allocations, and the Lost and Trinity Rivers are not listed as impaired for temperature.

²⁸ Substantial human-caused sediment-related channel alteration: A human-caused alteration of stream channel dimensions that increases channel width, decreases depth, or removes riparian vegetation to a degree that alters stream temperature dynamics and is caused by increased sediment loading.

²⁹ The temperature allocations for the discharges from Copco 1 and 2 and Iron Gate Reservoirs are based on the natural increase in water temperature within the river reaches occupied by those reservoirs, and assessed based on monthly average temperatures.

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organic matter (CBOD)³⁰ were set to ensure that the site-specific DO objectives are met in the river reaches in California. Thus, achievement of the Klamath River Nutrient and Organic Matter TMDL constitutes achievement of the Klamath River Dissolved Oxygen TMDL, except in Copco 1 and 2 and Iron Gate Reservoirs, which were assigned additional nutrient load allocations, as described below.

C. Klamath River Dissolved Oxygen Load Allocations

Achievement of the nutrient and organic matter allocations at Stateline and the tributary nutrient and organic matter allocations will not result in compliance with the DO and temperature load allocations within Copco 1, Copco 2, and Iron Gate Reservoirs during periods of thermal stratification. Therefore, additional dissolved oxygen load allocations are assigned to the reservoirs for the period of May through October to ensure compliance with the SSOs for DO and temperature objectives within the reservoirs, and ensure support of the cold freshwater habitat (COLD) beneficial use.

The temperature and DO allocations for waters within Copco 1, Copco 2, and Iron Gate Reservoirs are dual allocations, wherein achievement of the water quality objective for temperature must coincide with dissolved oxygen conditions compliant with the SSOs for DO, and vice versa. Allocations for dissolved oxygen and temperature equate to a “compliance lens” where both DO and temperature conditions meet objectives for water temperature and DO and are therefore protective of the COLD and MIGR beneficial uses.

The allocation applies during the critical period of May 1st through October 31st and requires that DO concentrations be consistent with the SSOs for DO included in Table 3-1a and overlap temperatures consistent with natural water temperatures at the point of entry to the reservoirs within a lens throughout the reservoir, or alternative in-reservoir temperature and DO conditions that provide equal or better protection of COLD and MIGR.

The volume of each reservoir's compliance lens is equal to the average hydraulic depth of the river in a free-flowing state for the width and length of the reservoir. The depth at which the compliance lens occurs within the reservoirs will vary, as will the instantaneous mass of DO required to meet the DO objective.

D. Klamath River Dissolved Oxygen Margin of Safety, Seasonal Variations, and Critical Conditions

To account for annual and seasonal variability, the Klamath River Dissolved Oxygen TMDL analysis evaluated DO processes throughout the calendar year. The seasonal variability is accounted for in the load allocations for nutrients and organic matter which are set to ensure that the site-specific DO objectives are met in the river reaches in California. The margin of safety for the Dissolved Oxygen TMDL is an implicit margin of safety as described in Section V.D.

V. Nutrient and Organic Matter

A. Klamath River Nutrient and Organic Matter Source Analysis

The Klamath River Nutrient, Organic Matter, and Dissolved Oxygen TMDLs rely on a single source analysis. That source analysis is described in Section IV.A above.

B. Klamath River Nutrient and Organic Matter TMDLs

The nutrient TMDLs are expressed in terms of total phosphorus (TP) and total nitrogen (TN). The organic matter TMDL is expressed in terms of carbonaceous biochemical oxygen demand or CBOD³¹.

The nutrient and organic matter TMDLs for the Klamath River in California are equal to the sum of waste load allocations, load allocations, and natural background loads for each parameter. The only waste load allocation assigned for these TMDLs is to the Iron Gate Hatchery. The contribution of natural background

³⁰ The allocations for organic matter are expressed as CBOD, and refer to CBOD-ultimate. The water quality models represent CBOD as organic matter; it is converted to CBOD-ultimate for TMDL allocation calculations.

³¹ CBOD is converted to CBOD-ultimate for TMDL allocation calculations. CBOD-ultimate is a measurement of oxygen consumed after sixty to ninety days of incubation.

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TP, TN, and CBOD loads are incorporated into the load allocations for each source area. Accordingly, the TMDL equations for TP, TN, and CBOD take the form of the following equation:

TP, TN, and CBOD TMDLs = Loading Capacity = Σ WLA + Σ LA where Σ = the sum, WLAs = waste load allocations, and LAs = load allocations.

The TP TMDL for the Klamath River in California equals 1,845 pounds per day. The TN TMDL for the Klamath River in California equals 14,985 pounds per day. The CBOD TMDL for the Klamath River in California equals 143,019 pounds per day.

C. Klamath River Nutrient and Organic Matter Load Allocations

The loading capacity and associated load and waste load allocations for TP, TN, and organic matter (CBOD) for the Klamath River in California, including Copco 1, Copco 2, and Iron Gate Reservoirs, are expressed in lbs/day, and are presented in Table 4-16.

D. Klamath River Nutrient, Organic Matter, and Microcystin Margin of Safety, Seasonal Variations, and Critical Conditions

The Klamath River Dissolved Oxygen, Nutrient and Organic Matter, and Microcystin TMDLs rely on an implicit margin of safety. An implicit margin of safety was deemed appropriate because uncertainty was reduced in the analysis by applying a comprehensive, dynamic numerical model. The model takes advantage of available data collected over multiple years, and through a series of mathematical computations represents the cause-effect relationship between discrete sources and water quality conditions throughout the Klamath's riverine, reservoir, and estuarine portions. By representing conditions in great detail spatially and temporally, the model effectively considers a spectrum of conditions that may be overlooked by a simpler analysis. It was determined that the largest source of uncertainty in this system is the highly variable and dominant loading from Upper Klamath Lake rather than the numeric water quality model.

Conservative assumptions that make up the implicit margin of safety are as follows:

- The numeric model used to predict the impact of allocations assumes that sediment oxygen demand (SOD) does not improve in the riverine sections following upstream load reductions. The magnitude of SOD will likely decrease with the decrease of organic loading allocated by the TMDL, and result in increased DO concentrations over time. Predicted conditions in the Klamath River are strongly influenced by the predicted variable conditions of the Upper Klamath Lake TMDL. Conservative allocations were set by using a combination of the predicted conditions. The timing of the allocations within Oregon is based on the scenario which represents the greatest loading from Upper Klamath Lake (i.e. results in the longest period of water quality not meeting numeric criterion). The magnitudes of the allocations are based on median loading conditions from Upper Klamath Lake. This is conservative because allocations are based on the difference from a baseline condition. The closer the concentration or temperature is to the numeric criteria, the less loading is necessary to cause a measurable degradation.

Table 4-16: Nutrient and Organic Matter Load Allocations (lbs/day)

Source Area	Daily TP Load Allocations (lbs.)	Daily TN Load Allocations (lbs.)	Daily CBOD Load Allocations (lbs.)
Stateline	245+	3,139+	19,067+
Upstream of Copco 1 Reservoir	(61)+	(330)+	(5,713)+
Stateline to Iron Gate Dam inputs	22+	339+	1,793+
Δ Iron Gate Hatchery	0+	0+	0+
Tributaries between Iron Gate Dam and the Shasta River	49+	317+	3,039+
Shasta River	75+	220+	2,406+

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Source Area	Daily TP Load Allocations (lbs.)	Daily TN Load Allocations (lbs.)	Daily CBOD Load Allocations (lbs.)
Tributaries between Shasta River and the Scott River	17+	97+	871+
Scott River	87+	1,279+	13,608+
Tributaries between Scott River and the Salmon River	187+	1,050+	9,423+
Salmon River	193+	1,583+	18,428+
Tributaries between Salmon River and the Trinity River	90+	504+	4,519+
Trinity River	762+	5,783+	66,571+
Tributaries between Trinity River and the Turwar Creek	179+	1,004+	9,007+
Total Maximum Daily Load	1,845	14,985	143,019

- An empirical analysis suggests that the TMDL model may underestimate nutrient loss and retention within the Klamath River. The underestimate does not appear to be large. However, this potential underestimate results in more conservative allocations upstream.
- The year chosen for developing the water quality models and establishing the TMDL was selected because it included periods of critical low flow and poor water quality conditions, which results in more stringent load allocations.
- Allocations to nonpoint sources are for all nutrients (TN, TP, and CBOD), not just the predicted limiting nutrient.
- Year 2000 flows are less than more recent flow requirements (i.e., USBR Klamath Project Operations and PacifiCorp Klamath Hydro Project Biological Opinion flows).

VI. Microcystin

A. Klamath River Microcystin Source Analysis

The sources of microcystin in the Klamath River were identified and quantified as part of one source analysis that addressed dissolved oxygen, nutrients and organic matter, and microcystin together, as described in Section IV.A above.

B. Load Allocations

The microcystin impairment is addressed by total phosphorus (TP) and total nitrogen (TN) load allocations, or alternative pollutant load reductions and/or alternative management measures or offsets, assigned to the owner(s) or operator(s) of Copco 1, Copco 2, and Iron Gate Reservoirs in order to achieve the in-reservoir chlorophyll-a, *Microcystis aeruginosa*, and microcystin target conditions protective of beneficial uses. The TP and TN load allocations that apply to PacifiCorp at a location upstream of Copco 1 equal:

- 67,048 pounds TP/year (184 lbs/day);
- 1,025,314 pounds TN/year (2,809 lbs/day);

and equate to the following annual reductions below the nutrient allocations at Stateline (to be achieved above Copco 1 Reservoir):

- 22,367 pounds TP/year (61 lbs/day);
- 120,577 pounds TN/year (330 lbs/day).

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C. Klamath River Microcystin Margin of Safety, Seasonal Variations, and Critical Conditions

The margin of safety, seasonal variations, and critical conditions for the Microcystin TMDL are addressed in Section V.D above.

VII. USEPA-Approved Lower Lost River TMDL

The source analysis, TMDL, load allocations, and discussion of the margin of safety, seasonal variations, and critical conditions for dissolved oxygen and pH impairments in the Lower Lost River are found in the *Lost River, California, Total Maximum Daily Loads for Nitrogen and Biochemical Oxygen Demand to Address Dissolved Oxygen and pH Impairments* that was established by the United States Environmental Protection Agency on December 30, 2008. The Lost River TMDL applies to the portion of the Lost River in the Mount Dome Hydrologic Subarea and the Tule Lake Hydrologic Subarea, together known as the Lower Lost River.

VIII. Klamath River and Lost River Implementation Plan

This implementation plan describes the specific actions that the Regional Water Board and other responsible parties shall implement to achieve the Klamath River and Lower Lost River TMDLs and meet temperature, dissolved oxygen, biostimulatory, and toxicity water quality standards in the Klamath River Basin. The implementation plan addresses sources of impairment throughout the Klamath River Basin, which includes the Lost River, the Shasta River, the Scott River, the Salmon River, the Trinity River, and all other tributary basins. The implementation plan gives consideration to the existing TMDL implementation plans in the Salmon, Scott, and Shasta basins.

The implementation plan includes a prohibition on unauthorized discharges that violate water quality objectives, guidance on the control of sediment waste discharges, a Thermal Refugia Protection Policy, and implementation actions that are assigned to specific responsible parties as presented in Table 4-18.

A. Coordination with Oregon

Achieving compliance with the Klamath River TMDLs in both California and Oregon requires a coordinated approach that involves state and federal agencies as well as responsible parties in both states. The Regional Water Board, Oregon Department of Environmental Quality (ODEQ), and USEPA Regions 9 and 10 have signed a Memorandum of Agreement (MOA) for implementing the Klamath River Basin TMDLs. The process will accommodate short-term measures working in concert with longer-term programs to achieve full compliance. This plan encourages implementation of large scale, engineered projects designed to reduce nutrient loads to the Klamath River in Oregon and California. Critical participants in this effort include the U.S. Bureau of Reclamation (USBR) and U.S. Fish and Wildlife Service; both federal agencies that have control over discharges from the Lost River basin that impact water quality in the mainstem Klamath River. Regional Water Board, ODEQ, and USEPA are working to develop a Klamath Basin water quality improvement tracking and accounting program. The cooperation and participation of PacifiCorp has been instrumental in supporting this endeavor. As planned, this program would provide a mechanism to allow for collaboration among basin stakeholders on common projects and calculates credit towards meeting regulatory requirements through offsite mitigation.

B. Nonpoint Source Implementation

The implementation actions described in Table 4-18 are necessary to implement the 2004 Statewide Nonpoint Source Pollution Control Program (NPS Policy). The NPS Policy requires the Regional Water Board to regulate all nonpoint source discharges of waste through some combination of regulatory tools that include Waste Discharge Requirements (WDRs), conditional waivers of WDRs, and Basin Plan prohibitions.³² For all currently unregulated nonpoint source discharges, the implementation plan directs the Regional Water Board to develop one or more regulatory tools as needed to control nonpoint source discharges of waste and implement the TMDLs. The implementation plan encourages and builds upon on-

³² The 2004 *Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program* (NPS Policy).

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going, proactive restoration and enhancement efforts in the watershed to the extent possible. Responsible parties that manage large land areas in the Klamath River Basin, such as the United States Forest Service, California Department of Transportation, and the Klamath River counties, are currently implementing land management programs that overlap several watersheds. For these parties, the Regional Water Board intends to implement a consistent regionwide approach that streamlines compliance with all existing and future TMDLs and makes efficient use of staff resources. With these goals in mind, the implementation plan seeks to coordinate actions with the existing land management programs with the requirements of the Klamath TMDLs and regionwide nonpoint source program objectives whenever possible.

C. Prohibition of Discharges in Violation of Water Quality Objectives in the Klamath River Basin

Discharges of waste that violate any narrative or numerical water quality objective that are not authorized by waste discharge requirements or other order or action by the Regional or State Water Board are prohibited.

D. Guidance to Control Excess Sediment Discharges

Parties conducting land use activities in the Klamath Basin that have the potential to discharge excess sediment are encouraged to implement the following sequential measures:

1. Prevent: Plan, design, and implement the project or activity in such a way that no excess sediment discharge occurs or could occur to waters of the state.
2. Minimize: If the discharge or threatened discharge of excess sediment cannot be fully prevented, then plan, design, and implement the project in such a way that discharges to waters of the state are minimized to the maximum extent possible.

Parties responsible for existing sediment sources should implement the following measures:

1. Inventory: Identify sources of excess sediment discharge or threatened discharge and quantify the discharge or threatened discharge from the source(s).
2. Prioritize: Prioritize efforts to control the inventoried sediment sources based on, but not limited to, severity of threat to water quality and beneficial uses, the feasibility of source control, and source site accessibility.
3. Schedule: Develop a schedule to implement the cleanup of excess sediment discharge sites.
4. Implement: Develop and implement feasible sediment control practices to prevent, minimize, and control the discharge.
5. Monitor and Adapt: Use monitoring results to direct adaptive management in order to refine excess sediment control practices and implementation schedules.

This guidance is suggestive only and in no way limits the enforcement authority of the Regional Water Board under applicable law.

E. Thermal Refugia Protection Policy

The Thermal Refugia Protection Policy provides enhanced protection of thermal refugia along the mainstem Klamath River and in the lower Scott River. Thermal refugia are typically identified as areas of cool water created by inflowing tributaries, springs, seeps, upwelling hyporheic flow, and/or groundwater in an otherwise warm stream channel offering refuge habitat to cold-water fish and other cold water aquatic species. The refugia created by tributaries in the Klamath River Basin are typically in the plumes and pools of cold water that form in the mainstem at the tributary confluence. Refugia can also exist in tributary streams themselves. Thermal refugia are essential to the support of the cold water fishery because they moderate naturally elevated temperatures in the mainstem Klamath River.

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1. Discharge Restriction In and Around Thermal Refugia

Parties conducting activities associated with suction dredging in the Klamath Basin are restricted from discharging waste in and around known thermal refugia within a specified instream buffer unless that activity is regulated by a separate regulatory mechanism such as WDRs, waiver(s) of WDRs, and/or a 401 water quality certification. The restriction applies April 15 to September 15 to protect thermal refugia when they are typically functioning in the mainstem Klamath River. The known thermal refugia locations are designated in Table 4-17 below.

**Table 4-17: Tributaries to the Klamath River
Known to Provide Thermal Refugia In and Around Their Confluence.**

Tributaries		
Aikens Creek	Halverson Creek	Pine Creek
Aubrey Creek	Hopkins Creek	Portuguese Creek
Barkhouse Creek	Horse Creek	Red Cap Creek
Beaver Creek	Humbug Creek	Reynolds Creek
Blue Creek	Hunter Creek	Roach Creek
Bluff Creek	Ikes Creek	Rock Creek
Bogus Creek	Independence Creek	Rogers Creek
Boise Creek	Indian Creek	Rosaleno Creek
Boulder Creek ¹	Irving Creek	Sandy Bar Creek
Cade Creek	Kelsey Creek ¹	Salt Creek
Camp Creek	King Creek	Seiad Creek
Canyon Creek ¹	Kohl Creek	Slate Creek
Cappell Creek	Kuntz Creek	Stanshaw Creek
Cheenitch Creek	Ladds Creek	Swillup Creek
China Creek	Little Horse Creek	Ten Eyck Creek
Clear Creek	Little Humbug Creek	Thompson Creek
Coon Creek	Little Grider Creek	Thomas Creek
Crawford Creek (Humboldt Co.)	Lumgrey Creek	Ti Creek
Crawford Creek (Siskiyou Co.)	McGarvey Creek	Titus Creek
Dillon Creek	Mill Creek	Tom Martin Creek
Doggett Creek	Miners Creek	Trinity River
Dona Creek	McKinney Creek	Tully Creek
Donahue Flat Creek	Nantucket Creek	Ukonom Creek
Elk Creek	Negro Creek	Ullathorne Creek
Elliot Creek	Oak Flat Creek	Walker Creek
Empire Creek	O'Neil Creek	West Grider Creek
Fort Goff Creek	Pecwan Creek	Whitmore Creek
Grider Creek	Pearch Creek	Wilson Creek

¹ Scott River tributary

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The default instream buffer for all thermal refugia in the Klamath Basin is 500 feet from the tributary confluence with the mainstem river in both the upstream and downstream direction and also upstream into the tributary.

Some thermal refugia require larger instream buffers than the default 500 feet and these site specific buffer lengths are given below. The larger buffers are needed in tributaries where fish have been found over 500 feet upstream of the tributary confluence or where the cold-water plume that creates the refugia extends for a distance greater than 500 feet downstream of the tributary confluence with the Klamath River.

A 3,000 foot buffer length is required in the following tributary creeks upstream of their confluence with the mainstem Klamath River:

Aubrey, Beaver, Clear, Dillon, Elk, Empire, Fort Goff, Grider, Horse, Indian, King, Little Horse, Little Humbug, Mill, Nantucket, O'Neil, Portuguese, Reynolds, Rock, Sandy Bar, Seiad, Stanshaw, Swillup, Thompson, Ti, and Titus.

A 1,500 foot buffer length is required in the mainstem Klamath River downstream of the confluence with the following tributary creeks:

Aubrey, Beaver, Clear, Dillon, Elk, Grider, Horse, Indian, Rock, Swillup, Thompson, and Ukonom.

2. Revising the Thermal Refugia List and Buffer Designations

The list of thermal refugia locations and/or buffer length designations may be revised through a public process. Persons proposing modification should submit supporting evidence to the Executive Officer. The Regional Water Board may add or remove thermal refugia and/or buffer length designations after public notice and opportunity for public comment, and upon final approval of a Basin Plan amendment. The current list and maps showing locations of thermal refugia and designated buffer lengths will be maintained on the Regional Water Board website at:

www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/klamath_river/.

3. Policy Directives and Recommendations

- a. Regional Water Board staff shall place heightened scrutiny on permits and 401 water quality certifications for activities that have the potential to impact the function of thermal refugia.
- b. The State Water Resources Control Board and the California Department of Fish and Game should restrict discharges associated with suction dredging activities as specified by this policy. This directive in no way limits the permitting agency from implementing more stringent requirements.
- c. State Water Resources Control Board staff shall consider the impact of increased diversions in tributaries that provide thermal refugia when issuing water rights permits to divert surface water in the Klamath River Basin in California.
- d. It is recommended that large landowners and land managers in the Klamath River Basin prioritize restoration and water quality control efforts in tributary watersheds that provide or otherwise create thermal refugia.
- e. In the event that suction dredging is determined to be a point source discharge, the prohibition on point source discharges to the Klamath River shall not apply to suction dredging activities except within the instream buffer lengths designated by this policy.

F. Individual Implementation Plan Actions

The implementation plan actions are organized into Table 4-18 by source or land use activity and by the responsible party(ies) considered appropriate to implement TMDL actions. Responsible parties may find that more than one implementation action is applicable to their circumstances. For each action in Table 4-18, there is a corresponding timeframe, within which the responsible party is expected to implement the action. Action items are fully independent of each other and require 100% implementation within each Source or Land Use category identified in Table 4-18.

IX. Enforcement

The Regional Water Board shall take enforcement actions for violations of this implementation plan where elements of the plan are enforceable restrictions, such as application of the waste discharge prohibitions, or as required under a specific permit or order, as appropriate. Enforcement implementation is ongoing. Nothing in this plan precludes actions to enforce any directly applicable prohibition or provisions found elsewhere in the Basin Plan or to require clean up and abatement of existing sources of pollution where appropriate.

X. Monitoring

A. Compliance Monitoring

Monitoring is an important component in determining the effectiveness of the TMDL implementation measures taken by the responsible parties. It is also important in determining the responsible parties' progress towards meeting the TMDL allocations. Monitoring by responsible parties shall be conducted upon the request of the Regional Water Board Executive Officer in conjunction with existing and/or proposed activities that have the potential to contribute to the TMDL impairments in the Klamath River Basin. Monitoring may involve implementation, upslope effectiveness, photo documentation, instream and near-stream effectiveness, and/or instream water quality monitoring. The Regional Water Board Executive Officer will base the decision to require monitoring on site-specific conditions, the size and location of the responsible parties' ownership, and/or the type and intensity of land uses being conducted or proposed. If monitoring is required, the Regional Water Board's Executive Officer will direct the responsible party to develop a monitoring plan and may describe specific monitoring requirements to include in the plan.

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Table 4-18: Implementation Actions

Source or Land Use Activity and Responsible Party	Implementation Actions
<p>Stateline Allocations</p> <p>Regional Water Board</p> <p>Oregon (ODEQ)</p> <p>USEPA 9 and 10</p>	<p><u>Action</u></p> <p>Work together to implement and monitor measures that will achieve compliance with the Klamath and Lost River TMDLs in Oregon and California as specified in the Klamath River/Lost River TMDL Implementation Memorandum of Agreement (MOA). The MOA includes commitments such as:</p> <ul style="list-style-type: none"> ▪ Work to develop and implement a joint adaptive management program, including joint time frames for reviewing progress and considering adjustments to TMDLs. ▪ Work with the Klamath Basin Monitoring Program (KBMP) and other appropriate entities to develop and implement basinwide monitoring programs designed to track progress, fill in data gaps, and provide a feedback loop for management actions on both sides of the common state border. ▪ Work jointly with common implementation parties (e.g., USBR, U.S. Forest Service, USFWS, BLM, PacifiCorp, and the Klamath Water Users Association (KWUA) to develop effective implementation plans and achieve water quality standards. ▪ Explore engineered treatment options such as treatment wetlands, algae harvesting, and wastewater treatment systems to reduce nutrient loads to the Klamath River and encourage implementation of these options where feasible. ▪ Work to develop and implement a basinwide water quality tracking and accounting program that would establish a framework to track water quality improvements, facilitate planning and coordinated TMDL implementation, and enable appropriate water quality offsets or trades. <p><u>Timeline</u></p> <p>Ongoing</p>

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Table 4-18: Implementation Actions

Source or Land Use Activity and Responsible Party	Implementation Actions
<p>U.S. Bureau of Reclamation's Klamath Project</p> <p>Regional Water Board</p> <p>US Bureau of Reclamation (USBR)</p> <p>US Fish and Wildlife Service (USFWS)</p> <p>Tulelake Irrigation District (TID)</p>	<p><u>Action</u> Develop and implement a Management Agency Agreement (MAA) between USBR, USFWS, TID, and the Regional Water Board that addresses the water quality impacts of the USBR's Klamath Project. The MAA should include the following action items:</p> <ul style="list-style-type: none"> ▪ Complete a water quality study based on best available science to characterize the seasonal and annual nutrient and organic matter loading through USBR's Klamath Project and refuges. The study should be completed in time to inform the development of a water quality management plan described in the following bullet. ▪ Based on the results of the water quality study, develop a water quality management plan to meet and/or offset the Lower Lost River and Klamath River TMDL allocations. The plan should be submitted to the Regional Water Board for approval by June 28, 2012. ▪ Include a schedule with interim milestones for meeting the TMDL allocations and targets. ▪ Coordinate implementation actions with other responsible parties discharging pollutants within USBR's Klamath Project and refuges. ▪ Develop a monitoring and reporting program with the Regional Water Board to evaluate the effectiveness of management measures and track progress towards meeting the Lower Lost River and Klamath River TMDL allocations and targets. ▪ Coordinate with the Klamath River water quality improvement tracking and accounting program in implementing offset projects. ▪ Periodically report to the Regional Water Board on actions taken to implement the TMDL and progress towards meeting the TMDL allocations and targets. <p><u>Timeline</u> Complete the MAA by June 28, 2011.</p>

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Table 4-18: Implementation Actions

Source or Land Use Activity and Responsible Party	Implementation Actions
<p>Klamath Hydroelectric Project</p> <p>PacifiCorp</p>	<p><u>Action</u> Submit a proposed implementation plan that incorporates timelines and contingencies pursuant to the KHSA. In the event that the KHSA does not move forward, the implementation plan should specify that the Federal Energy Regulatory Commission (FERC) 401 water quality certification process shall resume. Section 6.3.2 of the KHSA describes TMDL implementation to include a timeline for implementing management strategies, water quality-related measures in Appendix D, and Facilities Removal as the final measure. PacifiCorp may propose the use of offsite pollutant reduction measures (i.e., offsets or “trades”) to meet the allocations and targets in the context of the Interim measures 10 and 11 of the KHSA. The implementation plan should identify appropriate intervals whereby PacifiCorp will provide the Regional Water Board updates on the status and progress of the plan, and provide adequate time for review so that select project(s) are ready for construction by the date of the Secretarial Determination. The implementation plan must provide for Regional Water Board review of site specific environmental assessments of dam removal before the Regional Water Board’s approval of that approach as a final TMDL compliance measure.</p> <p><u>Timeline</u> By February 26, 2010.</p> <p><u>Action</u> Implement measures to meet and/or offset TMDL allocations and targets as prescribed in the approved implementation plan.</p> <p><u>Timeline</u> As required by the approved implementation plan.</p>
<p>Klamath Hydroelectric Project</p> <p>State Water Resources Control Board</p>	<p><u>Action</u> If applicable, process the 401 water quality certification for the FERC relicensing of the Klamath Hydroelectric Project to meet Basin Plan requirements, including Klamath River TMDL allocations and targets. This Action Plan is not intended to constrain the discretion of the State Water Board to determine, as appropriate, time periods required for various studies, options for interim requirements, and methods for final compliance.</p> <p><u>Timeline</u> Pursuant to the FERC licensing process timeline.</p>
<p>Iron Gate Hatchery</p> <p>Regional Water Board</p>	<p><u>Action</u> Revise NPDES Permit No. CA0006688 and WDR No. R1-2000-17 to incorporate revised effluent limits to implement the TMDL wasteload allocations, and the recalculated site-specific objectives for dissolved oxygen, and to require that the responsible parties implement measures to improve the water quality of discharges from the Iron Gate Hatchery to meet TMDL allocations and targets on a compliance schedule.</p> <p><u>Timeline</u> Bring revised permit to the Regional Water Board for consideration by December 2011.</p>
<p>Iron Gate Hatchery</p> <p>PacifiCorp</p> <p>CDFG</p>	<p><u>Action</u> Implement measures to improve the water quality of discharges from the Iron Gate Hatchery to meet and/or offset the Klamath River TMDL wasteload allocations and targets.</p> <p><u>Timeline</u> As specified in the revised NPDES permit.</p>

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Table 4-18: Implementation Actions

Source or Land Use Activity and Responsible Party	Implementation Actions
<p>Tulelake Wastewater Treatment Plant</p> <p>Regional Water Board</p>	<p><u>Action</u> Revise NPDES Permit No. CA0023272 and WDR No. R1-2004-0075 to include a compliance schedule and ensure that the discharge requirements are consistent with the Basin Plan requirements and the Lower Lost River TMDL wasteload allocations.</p> <p><u>Timeline</u> Bring revised permit to the Regional Water Board for consideration by June 2012.</p>
<p>Tulelake Wastewater Treatment Plant</p> <p>City of Tulelake</p>	<p><u>Action</u> Implement measures to improve the water quality of discharges from Tulelake Wastewater Treatment Plant to meet the Lower Lost River TMDL wasteload allocations.</p> <p><u>Timeline</u> As specified in the revised NPDES permit.</p>
<p>Trinity River Restoration Plan (TRRP)</p> <p>Regional Water Board</p>	<p><u>Action</u> Develop general Waste Discharge Requirements/401 water quality certification for TRRP mechanical restoration.</p> <p><u>Timeline</u> 2010</p>
<p>Trinity River Restoration Plan</p> <p>US Bureau of Reclamation</p>	<p><u>Action</u> Implement Trinity River Restoration Plan Record of Decision.</p> <p><u>Timeline</u> Ongoing</p>
<p>Road Construction and Maintenance on County Lands</p> <p>Regional Water Board</p>	<p><u>Action</u> The Regional Water Board shall consider adopting a resolution and accompanying waiver for maintenance of county roads certifying the Five Counties Salmonid Conservation Program (5C Program) if it complies with the TMDL and attains standards in accordance with California Impaired Waters Guidance.³³</p> <p><u>Timeline</u> December 2010</p> <p><u>Action</u> In the event that a county does not show intent to implement the 5C Program, develop WDRs or a conditional waiver of WDRs for that county.</p> <p><u>Timeline</u> June 2011</p>

³³ In any resolution certifying that another entity's program will comply with the TMDL and attain standards, the Regional Water Board must demonstrate in the resolution that the implementing program is consistent with the assumptions and requirements of the TMDL, that sufficient mechanisms exist to provide reasonable assurances that the program will address the impairment in a reasonable period of time, and that sufficient mechanisms exist to ensure that the program will be enforced, or that the Regional Water Board has sufficient confidence that the program will be implemented such that further regulatory action would be unnecessary and redundant. (A Process for Addressing Impaired Waters in California, SWRCB Resolution No. 2005-0050 (June 2005) found on page 6-10.)

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Table 4-18: Implementation Actions

Source or Land Use Activity and Responsible Party	Implementation Actions
<p>Road Construction and Maintenance of State Highway Facilities</p> <p>Caltrans</p>	<p><u>Action</u> Implement the measures outlined above to control the discharge of excess sediment from their facilities and comply with the Klamath TMDL allocations even if measures are not incorporated into the statewide Caltrans permit.</p> <p><u>Action</u> Implement measures to meet the excess solar radiation allocation, even if measures are not incorporated into the statewide Caltrans permit.</p> <p><u>Action</u> Fully assess all barriers and potential barriers to migration caused by Caltrans road and highway facilities along the mainstem Klamath River and in the tributary watersheds identified in the Thermal Refugia Protection Policy. Develop a priority ranking and time schedule for modifying the identified fish passage barriers to accommodate free passage of fish upstream and downstream.</p> <p><u>Timeline</u> Caltrans shall submit annual reports to the Regional Water Board documenting progress in implementing the above measures.</p>
<p>Road Construction and Maintenance on County Lands</p> <p>Del Norte, Humboldt, Siskiyou, and Trinity Counties</p>	<p><u>Action</u> Implement measures through the 5C Program.</p> <p><u>Timeline</u> Pursuant to the 5C Program timelines.</p>
<p>Road Construction and Maintenance of State Highway Facilities</p> <p>State Water Resources Control Board</p> <p>Regional Water Board</p>	<p><u>Action</u> Incorporate the following measures into the NPDES Statewide Storm Water Permit and Waste Discharge Requirements for the State of California, Department of Transportation (Caltrans permit) to address sediment sources from road and highway facilities under Caltrans control:</p> <ol style="list-style-type: none"> 1. <u>Inventory</u>: Identify sources of excess sediment discharge or threatened discharge and quantify the discharge or threatened discharge from the source(s). 2. <u>Prioritize</u>: Prioritize efforts to control the inventoried sediment sources based on, but not limited to, severity of threat to water quality and beneficial uses, the feasibility of source control, and source site accessibility. 3. <u>Schedule</u>: Develop a schedule to implement the cleanup of excess sediment discharge sites. 4. <u>Implement</u>: Develop and implement feasible sediment control practices to prevent, minimize, and control the discharge. 5. <u>Monitor and Adapt</u>: Use monitoring results to direct adaptive management in order to refine excess sediment control practices and implementation schedules. <p><u>Action</u> Incorporate measures to meet the excess solar radiation allocation in the statewide Caltrans permit and 401 water quality certifications.</p> <p><u>Timeline</u> The revised permit is anticipated to be adopted by the State Water Resources Control Board by August 2010, with USEPA adoption anticipated by December 2010.</p>

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Table 4-18: Implementation Actions

Source or Land Use Activity and Responsible Party	Implementation Actions
<p>Agricultural Activities on Non-Federal Lands</p> <p>Regional Water Board</p>	<p><u>Action</u> Develop a conditional waiver of WDRs for discharges associated with agricultural activities, including grazing and irrigated agriculture, in the Klamath River Basin. The conditional waiver shall require compliance with the Klamath River TMDL load allocations where they apply and will serve as the means of compliance with the Lower Lost River TMDL load allocations associated with agricultural sources.</p> <p><u>Timeline</u> Regional Water Board staff shall propose the conditional waiver for Regional Water Board consideration by December 2012.</p>
<p>Agricultural Activities on Non-Federal Lands</p> <p>Responsible Parties (Any party conducting grazing activities or activities associated with irrigated agriculture that discharge waste or have the potential to discharge waste on non-federal land in the Klamath River Basin)</p>	<p><u>Action</u> The Regional Water Board recommends the following actions:</p> <ol style="list-style-type: none"> 1. Document past projects and current practices that address sources of pollution from their operations. 2. Organize into watershed groups to report to the Regional Water Board as a group as part of the future waiver program. 3. Participate in the development of the conditional waiver through a Technical Advisory Group that will convene to develop the draft waiver by December 2011. 4. Attend water quality training on implementing management practices and/or water quality management plan development. <p><u>Timeline</u> From Regional Water Board adoption of the Klamath River TMDL Action Plan until adoption of the conditional waiver addressing agricultural discharges.</p>
<p>Timber Harvest Activities on Non-Federal Lands</p> <p>Regional Water Board</p>	<p><u>Action</u> The Regional Water Board shall adopt individual watershed-wide and ownership WDRs, in lieu of the general WDR or conditional waiver of WDRs, to achieve the TMDL load allocations and water quality standards as appropriate.</p> <p><u>Action</u> Regional Water Board staff shall make recommendations for additional measures to ensure the water quality objective for temperature is achieved during the timber harvest review process, if necessary.</p> <p><u>Timeline</u> Ongoing</p>
<p>Timber Harvest Activities on Non-Federal Lands</p> <p>Responsible Parties (Any party conducting timber harvest activities that discharge waste or have the potential to discharge waste in the Klamath River Basin.)</p>	<p><u>Action</u> Implement riparian management measures that meet the riparian shade allocations and water quality standards. Where the Forest Practice Rules, including the Anadromous Salmonid Protection Rules, are not sufficient to meet the TMDL allocations or water quality standards, implement additional measures as directed by Regional Water Board staff during the timber harvest review process.</p> <p><u>Timeline</u> Ongoing</p>

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Table 4-18: Implementation Actions

Source or Land Use Activity and Responsible Party	Implementation Actions
All Activities on USFS Lands Regional Water Board	<u>Action</u> Develop a conditional waiver of WDRs for nonpoint source activities on USFS lands that includes conditions that implement the Klamath TMDL. <u>Timeline</u> Develop for consideration by the Regional Water Board by April 2010.
All Activities on Lands Managed by the USFS USFS	<u>Action</u> Conduct land management activities in compliance with the waiver of WDRs when adopted. <u>Timeline</u> As required in the waiver of WDRs.

B. Basin-Wide Monitoring

Basin-wide TMDL monitoring will be coordinated with other monitoring efforts in the Klamath River watershed. The overall goal of TMDL monitoring is to track progress towards meeting the water quality standards and the TMDL allocations. Monitoring results will also be used to reassess the effectiveness and appropriateness of the Action Plan and to make revisions as necessary.

The objectives of the monitoring plan include:

- Assessment of water quality standards attainment.
- Verification of pollution source allocations.
- Calibration or modification of the model used in the TMDL analysis.
- Evaluation of progress towards meeting TMDL allocations.
- Evaluation of point and nonpoint source control implementation and effectiveness.
- Evaluation of instream water quality.
- Evaluation of temporal and spatial trends in water quality.
- Evaluation of the risk to public health related to cyanobacteria and cyanotoxin exposure.
- Evaluation of the functionality of thermal refugia in the Klamath River Basin.
- Provide data for the development of the Klamath River Basin water quality improvement tracking and accounting program.

The Klamath River TMDL monitoring plan is complimentary to other basinwide monitoring programs in the Klamath River Basin including the Klamath Basin Monitoring Program and the Klamath Hydroelectric Settlement Agreement Interim Measure 12 Water Quality Monitoring Plan.

XI. Reassessment and Adaptive Management

The Regional Water Board will review, reassess, and make any necessary revisions to this implementation plan. Regional Water Board staff will report to the Regional Water Board at least yearly on the status and progress of implementation activities, and the attainment of the Klamath TMDLs. Every five years, Regional Water Board staff will conduct a comprehensive and formal assessment of the effectiveness of the implementation plan. During reassessment, the Regional Water Board will consider how effective the requirements of the TMDL implementation plan are at meeting the TMDLs, achieving water quality objectives, and protecting the beneficial uses of water in the Klamath River Basin.

The success of the TMDL will be assessed based on water quality trends in the Klamath River Basin and the degree to which responsible parties are meeting the TMDL load allocations. The monitoring program is designed to track water quality trends and timelines for meeting target water quality conditions. Progress towards meeting TMDL allocations and targets will be reported by the responsible parties pursuant to monitoring requirements in WDRs, waivers, and other mechanisms. The assessment of responsible party

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compliance with the TMDL will be based on compliance with applicable WDRs and waivers, water quality certifications and other orders, individual implementation plans, and management agency agreements.

A. Responsible Party Compliance

The items that will be evaluated in the annual and five-year reassessments are shown below in relation to the responsible parties named in the implementation plan.

USBR, USFWS and TID

- Timely completion of the MAA and implementation of the MAA measures.
- Water quality monitoring of nutrient and organic matter reductions to meet the load allocations in the Lower Lost River and Klamath River TMDLs in California and Oregon.

PacifiCorp

- Reductions in nutrients and organic matter entering the reservoirs.
- Reductions in chlorophyll a concentrations in the reservoirs.
- Effectiveness of temperature and nutrient offset projects as calculated through tracking and accounting program ratios.

USFS

- Reporting through waiver monitoring and reporting program on progress to meet TMDL allocations and targets.

Timber Harvest

- Reporting through waivers and WDRs for timber harvest projects.

Agriculture

- Development of agricultural waiver.
- Implementation and reporting per the waiver program.

County Roads

- Compliance with 5 C Program.

State Roads

- Adherence to Guidance for Control of Excess Sediment Discharges.
- Incorporation of TMDL implementation measures into Statewide permit.
- Assess migration barriers.

4.2.12 Action Plan For The Upper Elk River Sediment TMDL

The Elk River Watershed is located in Humboldt County in northern California and drains into Humboldt Bay, south of the City of Eureka. Due to excessive sedimentation, the entire 58.3 square mile (37,310 acres) Elk River Watershed was placed on the Impaired Waters List for Section 303(d) of the Clean Water Act in 1998. This sediment TMDL addresses impairments in the 44.2 square mile (28,288 acres) Upper Elk River Watershed, which is predominantly timberland and includes impacted reaches wherein the most sediment has been stored and subsequent effects observed. The Program of Implementation described below includes nonregulatory actions that are designed to address sedimentation throughout the watershed. The Action Plan for the Upper Elk River Sediment TMDL (hereinafter known as the TMDL Action Plan) does not establish sediment load allocations for landuse in the Martin Slough or Lower Elk River West subwatersheds, nor for activities in the Lower Elk River subwatershed that are downstream of Berta Road.

The TMDL Action Plan includes a phased total maximum daily load (TMDL) for sediment and describes the implementation actions necessary to attain water quality standards in the Upper Elk River Watershed. The goal of the TMDL Action Plan is to achieve sediment related water quality standards, including the protection of the beneficial uses of water in the upper watershed and prevention of nuisance conditions. The TMDL Action Plan establishes the sediment load consistent with current conditions in the impacted reaches, identifies a process for assessing and implementing necessary and feasible remediation and restoration actions, and describes a program of implementation to be considered and incorporated into regulatory and non-regulatory actions of the Regional Water Board and other stewardship partners in the watershed.

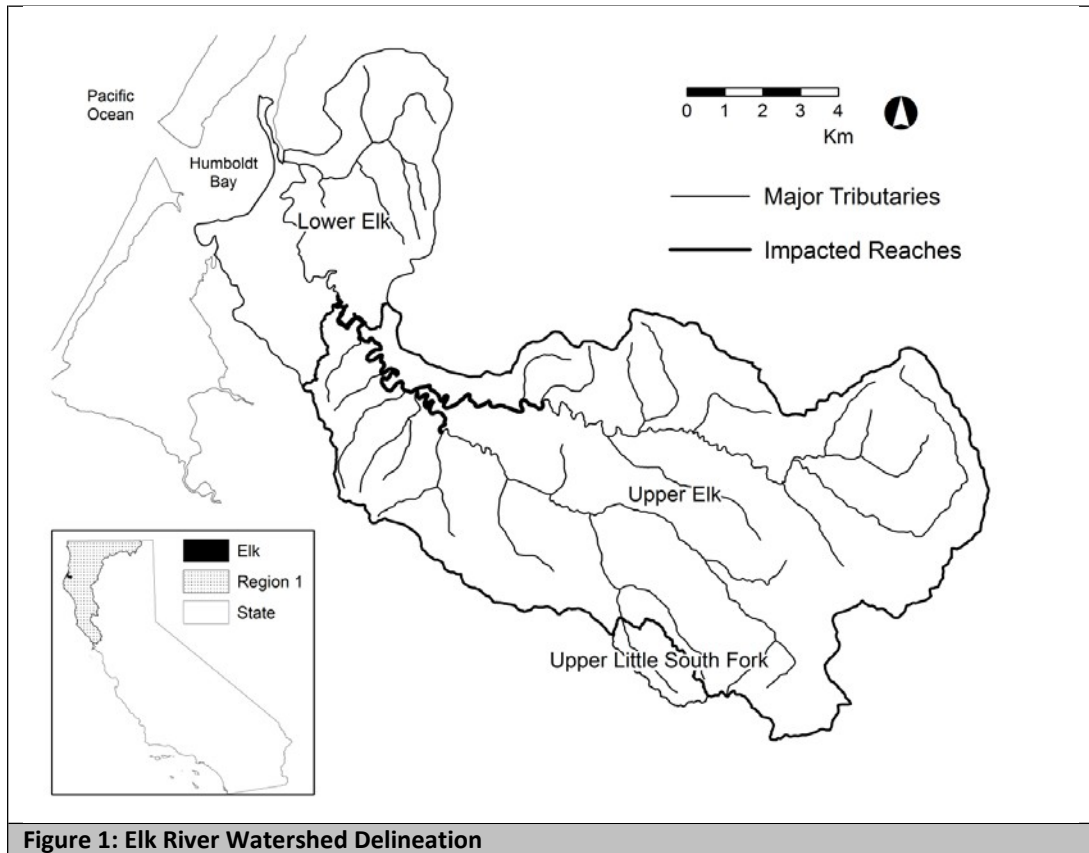


Figure 1: Elk River Watershed Delineation

I. Problem Statement

Site specific assessment of water quality conditions in the Upper Elk River Watershed confirm that sediment discharges from timberlands in the upper watershed and sedimentation in the impacted reaches, combining with other natural (e.g., tectonics, geology, soil characteristics, geomorphology, climate and vegetation) and anthropogenic (e.g., pre-Forest Practices Act logging, ranching, farming, roads, and residential development) factors exceed the water quality objectives for sediment, suspended material, settleable matter, and turbidity and result in adverse impact to several beneficial uses, including domestic water supplies (MUN), agricultural water supplies (AGR), cold water habitat (COLD); spawning, reproduction and early development (SPWN); rare, threatened, or endangered species (RARE), and recreation (REC-1 and REC-2). Sedimentation in the impacted reaches also has resulted in conditions of nuisance, including increased rates and depth of annual flooding and loss of property, use of property, access to property, and risk to human health and welfare. The impacted reach extends from the confluence of Brown’s Gulch on the North Fork Elk and Tom Gulch on the South Fork Elk to the mainstem Elk River at Berta Road and is contained within the delineated boundaries of the Upper Elk River Watershed.

II. Source Analysis

Multiple natural and anthropogenic factors influence the behavior of sediment in the Elk River Watershed. Table 1 summarizes the estimated sediment loads, organized by source category and analysis time period. The presented estimates represent the data collection and assessment efforts of multiple federal, state, private and nonprofit entities over the course of more than 10 years. The estimates combine the results of numerous Elk River specific studies, which constitute a rich and abundant dataset. Nonetheless, there is inherent uncertainty in the estimates, derived from necessary assumptions and conservative margins of safety. The estimates provide an adequate and reasonable basis for establishing a TMDL and load allocations. An adaptive management framework allows for adjustments to the program of implementation, as new data become available. Primary natural factors include: tectonics, geology, topography, geomorphology, climate and vegetation. Geological features are an especially important factor in sediment production in the Upper Elk River, which is dominated by young, fine-grained, erodible geology. Primary anthropogenic or land use-related factors include: timber harvest, yarding, road building and use, and legacy practices (e.g., pre-Forest Practice Rules). The interaction between inherent watershed characteristics, types of management practices, and timing of stochastic events such as earthquakes or large storm events, influence the magnitude and timing of sediment production. Increased sediment production results from greater incidence of landsliding, surface and gully erosion, and increases in channel erosion from increased peak flows and higher runoff.

Sediment transported from the upper sub-watersheds has deposited in low gradient channel and floodplain reaches, impacting residential and agricultural communities with increased incidence of overbank flooding, defined as nuisance conditions. Ongoing sediment loading continues to result in aggradation of fine sediment, encroachment of riparian vegetation, and impairment of beneficial uses, though the total volumes of delivered sediment have decreased since the 1988-1997 time period. The causes of reduced sediment loading have not been clearly established. But, improvements in management practices in the 2004-2011 period, as well as smaller magnitude peak flow events and a limited number of relatively wet years in this period, likely play a role. Cross sectional changes observed over the past three decades starting in 1988 indicate an estimated 640,000 cubic yards of sediment have accumulated in the impacted reaches. An estimated 25% of the annual sediment inflow to the impacted reaches causes aggradation and further worsens nuisance conditions.

The sediment source analysis identifies the key sediment source categories that produce sediment in the Upper Elk River Watershed. Sediment discharges resulting from timber harvest and other land-management activities in the most recent analysis time period (2004-2011) are (in order of significance): in-channel sources (headward channel incision, bank erosion, and streamside landslides), discharges from existing land use-related sediment discharge sites, other road-related discharges, and harvest-related discharges.

Table 1: Summary of Upper Elk River volumetric loading ($\text{yd}^3 \cdot \text{mi}^{-2} \cdot \text{yr}^{-1}$) by sediment source category and analysis time period								
Sediment Source Category		1955	1967	1975	1988	1998	2001	2004
		- 1966	- 1974	- 1987	- 1997	- 2000	- 2003	- 2011
Anthropogenic	In-Channel: Low Order Channel Incision	67	23	14	21	32	12	14
	In-Channel: Management-Related Bank Erosion & Streamside Landslides	186	141	54	219	240	240	160
	Road-Related Landslides	99	29	15	307	3	20	25
	Road Surface Erosion	52	78	87	137	55	56	22
	Land Use-related Sediment Discharge Sites	30	60	80	65	39	73	39

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Table 1: Summary of Upper Elk River volumetric loading ($\text{yd}^3 \cdot \text{mi}^{-2} \cdot \text{yr}^{-1}$) by sediment source category and analysis time period								
Sediment Source Category		1955	1967	1975	1988	1998	2001	2004
		- 1966	- 1974	- 1987	- 1997	- 2000	- 2003	- 2011
Anthropogenic	Post-Treatment Sediment Discharge Sites	0	0	0	0	13	4	24
	Skid Trails	4	12	11	12	26	15	15
	Open Slope Landslides	189	82	6	201	118	51	5
	Harvest Surface Erosion	2	6	2	5	6	5	4
	Anthropogenic Loading	629	431	268	966	531	476	308
Natural Loading		152	132	93	167	176	176	144
Total Loading		781	563	360	1,133	707	652	452

III. Water Quality Indicators

Water quality indicators and associated numeric targets are not independently enforceable and are designed to measure progress towards attaining water quality objectives for suspended material, settleable material, turbidity and sediment. The water quality indicators are divided into hillslope and instream, as identified in Tables 2 and 3, respectively. The hillslope indicators and numeric targets in Table 2 are designed to inform Board actions and can be incorporated into orders, as appropriate and to the maximum extent feasible. The instream water quality indicators are designed to help assess the overall effectiveness of the program of implementation and confirm progress towards attainment of applicable water quality standards.

Attainment of water quality objectives is partly dependent on the control of sediment discharges from the Upper Elk River Watershed to minimize increased sediment production and other controllable water quality factors (e.g., altered hydrology and reduction in large woody debris recruitment trees).

Table 2: Hillslope Water Quality Indicators and Numeric Targets [†]		
Indicator	Numeric Target	Associated Area
Hydrologic connectivity of roads to watercourses	100% of road segments hydrologically disconnected from watercourses	All roads
Sediment delivery due to surface erosion from roads	Decreasing road surface erosion	
Sediment delivery due to road-related landslides	Decrease in sediment delivery from new and reactivated road-related landslides	
Common Harvest-Related Indicators		
Sediment delivery due to surface erosion from harvest areas	100% of harvest areas have ground cover sufficient to prevent surface erosion	All harvest areas
Sediment delivery from open slope landslides due to harvest-related activities	Decrease in sediment delivery from new and reactivated open-slope landslides	All open slopes

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Table 2: Hillslope Water Quality Indicators and Numeric Targets[†]		
Indicator	Numeric Target	Associated Area
Sediment delivery from deep seated landslides due to harvest-related activities	Zero increase in discharge from deep-seated landslides due to management-related activities	All deep-seated landslides
Common Management Discharge Site Indicators		
New management discharge sites	No new management discharge sites created	Class I, II, and III watercourses
Specific Upper Elk River Watershed Indicators		
Headward incision in low order channels	Zero increase in the existing drainage network	Class II/III catchments
Peak flows	Less than 10% increase in peak flows in 10 years related to timber harvest	Class II/III catchments
Channels with actively eroding banks	Decreasing length of channel with actively eroding banks	Class I, II, and III watercourses
Characteristics of riparian zones (i.e., 300 feet on either side of the channel) associated with Class I and II watercourses	Improvement in the quality/health of the riparian stand so as to promote 1) delivery of wood to channels, 2) slope stability, and 3) ground cover	Class I and II watercourses
Characteristics of riparian zones (i.e., 150 feet on either side of the channel) associated with Class III watercourses	Improvement in the quality/health of the riparian stand so as to promote 1) delivery of wood to channels, 2) slope stability, and 3) ground cover	Class III watercourses

† The hillslope indicators and numeric targets in Table 2 are designed to inform Board actions and can be incorporated into orders, as appropriate and to the maximum extent feasible

Table 3: Instream Water Quality Indicators and Numeric Targets		
Instream Indicator	Numeric Target	Associated Area
Bankfull Channel Capacity	Channel cross-sectional area sufficient to contain the historic bankfull discharges: Upper Mainstem = 2,250 cfs (for drainage area of 43 mi ²) Lower North Fork, = 1,170 cfs (for drainage area of 22.5 mi ²) Lower South Fork = 1,015 cfs (for drainage area of 19.5 mi ²)	Impacted reaches near the confluence of North and South Forks Elk River, with target discharge scaled to drainage area at measurement location
Chronic turbidity	Clearing of turbidity between storms to a level sufficient for salmonid feeding and surface water pumping for domestic and agricultural water supplies	Salmonid feeding— watershed-wide historic range of salmonids Water supplies—Impacted reaches

IV. Sediment TMDL and Load Allocation, including Margin of Safety and Consideration of Seasonal Variation

TMDLs must be established at levels necessary to attain and maintain the applicable water quality standards with seasonal variations and a margin of safety (MOS) (40 CFR Part 130.7(c)(1).) The TMDL represents the maximum amount of a pollutant that can be discharged to a waterbody, taking into account critical conditions of stream flow, loading, and water quality parameters. The TMDL is equivalent to the loading capacity of the waterbody for the pollutant in question.

The Upper Elk River Sediment TMDL is set equal to the loading capacity of the waterbody. The loading capacity of the Upper Elk River Watershed is defined as the total sediment load (natural and management-related) that can be discharged into the Upper Elk River and its tributaries without impacting beneficial uses of water, causing an exceedance of water quality objectives, reducing the quality of high quality water, or creating nuisance conditions. Because capacity for sediment is limited by the ongoing aggradation in the impacted reaches, the loading capacity for additional sediment is defined as zero until the capacity of the impacted reaches can be expanded.

All the sediment delivered to the stream channels in the Upper Elk River Watershed is attributed to management-related nonpoint source pollution and natural background. Due to the lack of sediment loading capacity in the impacted reaches, the nonpoint source load allocation is defined as zero. This approach incorporates a conservative, implicit MOS1 and includes seasonal variation of sediment production through estimating sediment loads on an annual time step. The zero load allocation is necessarily conceptual since, using current technology and techniques, no amount of land use restriction

can physically result in zero loading of non-point source sediment (i.e., the control of all natural and anthropogenic sediment delivery from the tributary system). This regulatory loading capacity will guide the program of implementation and will be maintained until the sediment loading capacity of the impacted reaches has been expanded. The zero load allocation does not constitute an effluent limitation or a waste load allocation, and the Board has discretion on how to implement it in WDRs, waivers or other actions to reduce and eliminate waste discharges. Once the loading capacity has been expanded, the Regional Water Board can reevaluate the load allocation and establish a second phase of the TMDL, as appropriate.

V. Watershed Efforts

Throughout the Elk River Watershed, many individuals, groups, and agencies have been working to assess, enhance, and restore beneficial uses and assess, abate, and prevent nuisance conditions related to sedimentation and flooding. These groups include, but are not limited to the Regional Water Quality Control Board, State Water Resources Control Board, Bureau of Land Management, National Oceanographic and Atmospheric Administration, U.S. Fish and Wildlife Service, U.S.D.A. Forest Service Redwood Sciences Laboratory and National Resources Conservation Service, U.C. Cooperative Extension, California Department of Fish and Wildlife, California Department of Forestry and Fire Protection, Board of Forestry, California Coastal Conservancy, Humboldt County Board of Supervisors and Planning Department, Redwood Community Action Agency, Salmon Forever, Friends of Elk River, CalTrout, Elk River Residents Association, Humboldt Redwood Company, Green Diamond Resource Company, individual residents and landowners, and other watershed stakeholders.

In February 2012, the Regional Water Board, in coordination with Redwood Community Action Agency, held a Restoration Summit to explore strategies for restoration of the low gradient reaches of Elk River impacted by stored sediment deposits. The primary purpose of this summit was to convene affected landowners, resource agency staff, technical experts, potential funders, and diverse stakeholders to discuss approaches to addressing long-standing channel restoration, excess sediment loads, nuisance flooding, and related issues in the impacted reaches of the Elk River Watershed. A conclusion of the Restoration Summit was to pursue funding for full-scale data collection and sediment and hydrodynamic modeling from the top of the impacted reaches to Humboldt Bay, so as to characterize existing conditions and inform sediment remediation and channel restoration activities necessary to prevent nuisance and recover beneficial uses.

In 2014, the State Water Resources Control Board executed a contract with CalTrout, relying primarily on funds from the State's Cleanup and Abatement Account, but including contributions from the California Coastal Conservancy and Humboldt Redwood Company, to conduct the Elk River Recovery Assessment.

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The Elk River Recovery Assessment is designed to assess the fate and transport of fine sediment from the top of the impacted reaches downstream to Humboldt Bay. The Elk River Recovery Assessment requires the collection of sediment and hydraulic data, which is used to populate full scale hydrodynamic and sediment transport models within which several different remediation and restoration scenarios can be tested. The Elk River Recovery Assessment will provide the feasibility assessment from which a remediation action plan can be developed in coordination with the Elk River Watershed Stewardship Program.

In 2015, Humboldt County was awarded 319(h) grant funds to develop and initiate an Elk River Watershed Stewardship Program through which to develop consensus-based recommendations with respect to health and safety, sediment remediation and habitat restoration, and science and coordinated monitoring needs in the Elk River Watershed. The Elk River Watershed Stewardship Program developed under this contract will provide the framework within which to implement non-regulatory components of phase 1 of the TMDL.

VI. Program of Implementation

The Program of Implementation identifies a combination of regulatory and non-regulatory actions that will lead to the attainment of water quality objectives, recovery of beneficial uses, protection of high quality waters, and prevention of nuisance conditions in the Upper Elk River Watershed. Implementation of phase 1 requires control of all existing and potential future sediment sources in the upper watershed while the Elk River Recovery Assessment is completed and the Elk River Watershed Stewardship Program is developed, initiated, and successfully results in the activities necessary to expand the sediment loading capacity of the impacted reaches and abate nuisance conditions. The Regional Water Board can recalculate, as appropriate, the sediment TMDL following remediation and restoration of the impacted reaches, by assessing the expanded capacity of the watershed to transport sediment and water more normally. Normal sediment and water transport occurs when 1.5 to 2-year flood events are contained within the bankfull stream channel. As appropriate, the Regional Water Board may modify the program of implementation for a second phase of the TMDL Action Plan if the sediment TMDL is recalculated.

There are three main components of the program of implementation associated with phase 1 of the TMDL Action Plan, including:

- a. Waste Discharge Requirements (WDR) or waiver of WDRs: Applicable regulatory programs to reduce sediment loads from new and existing sediment sources on lands in the Upper Elk River Watershed, so as to reduce sediment loading toward the load allocation;
- b. Elk River Recovery Assessment: A non-regulatory feasibility assessment of the sediment remediation and channel restoration activities, which in combination with sediment load reductions, are necessary to improve hydraulic and sediment transport in the Elk River Watershed; and
- c. Watershed Stewardship Program: A non-regulatory program under which implementation of health and safety projects, remediation and restoration activities, and science and coordinated monitoring serves to support beneficial use enhancement and a trajectory of watershed recovery, including abatement of nuisance flooding and an expansion of sediment loading capacity.

Implementation actions associated with each of the three components of the program of implementation are identified in Table 4.

WDRs: WDRs are the primary regulatory mechanism utilized by the Regional Water Board to control the nonpoint source pollution resulting from past and ongoing timber harvesting activities, the dominant land use in Upper Elk River Watershed. Existing adverse cumulative impacts from current and past land management practices combined with watershed characteristics (such as sensitive geology and altered hydrologic conditions) require that additional actions be taken beyond those currently being implemented in the Upper Elk River Watershed. Updated management actions are necessary to prevent continued impact to beneficial uses and contributions to downstream nuisance conditions that result from ongoing timberland management. The WDRs will consider the unique watershed factors that influence the discharge of sediment so as to properly update management practices and better manage watershed effects.

The Regional Water Board has discretion in developing WDRs that can allow individual dischargers to tailor a compliance strategy. Humboldt Redwood Company (HRC) is the largest landowner, with 79 percent

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ownership of the Upper Elk River Watershed. In 2016, the Regional Water Board will consider adoption of WDRs to address waste discharges and other controllable water quality factors on lands within the Upper Elk River Watershed owned by HRC. The WDRs shall provide for implementation of rigorous best management practices (BMPs) with variation according to the sediment loading risk of individual sub-watersheds.

Other landowners include Green Diamond Resource Company (GDRC), Bureau of Land Management (BLM), and individual non-industrial timberland owners. As part of its ownership WDRs for timber harvesting and roads, GDRC has a South Fork Elk Management Plan. (Order No. R1-2012-0087 Waste Discharge Requirements for Discharges Related to Green Diamond Resource Company's Forest Management Activities Conducted within the Area Covered by Its Aquatic Habitat Conservation Plan in the North Coast Region, Humboldt and Del Norte Counties). The South Fork Elk Management Plan shall be modified to be consistent with the TMDL Action Plan and available for Regional Water Board consideration in 2016. The BLM manages the Headwaters Forest Reserve comprising about 7,472 acres of old growth coast redwood as part of the National Landscape Conservation System. The 2004 Management Plan for the Headwaters Forest Reserve focuses on restoration, research, and recreation/education and is being updated. BLM management of the Headwaters Forest generally provides benefits to water quality in the Elk River Watershed. Any BLM projects expected to discharge sediment can be enrolled and regulated as a Category B project under the USFS Waiver. (Order No. R1- 2015-0021 Waiver of Waste Discharge Requirements for Nonpoint Source Discharges Related to Certain Federal Land Management Activities on National Forest System Lands.) Non-industrial timber management Plan (NTMP) owners must enroll under the General NTMP WDRs in Tier B (Order No. R1- 2013-0005 General Waste Discharge Requirements for Discharges for Timber Operations on NTMPs). Tier B requires that a landowner submit an erosion control plan (ECP) for their entire NTMP area. Other timberland owners may enroll individual THPs under the General Timber WDRs (Order No. 2004-0030) with any additional conditions identified during THP review to make consistent with the TMDL Action Plan.

Elk River Recovery Assessment: The State Water Resources Control Board executed a contract with CalTrout in 2014 to conduct full scale sediment and hydrodynamic modeling from the top of the impacted reach to the river's outlet at Humboldt Bay, with a final deliverable due in 2017. This is a non-regulatory assessment of the feasibility of improving conditions in the impacted reaches of the Upper Elk River Watershed. The final assessment report is expected to result in the technical foundation for a remediation action plan by which to initiate recovery of ecosystem functions and beneficial uses in the Elk River and abate nuisance conditions. Potential recovery actions may include dredging, new channel construction, off-channel sediment detention basins, levee construction or modification, vegetation management, infrastructure improvements, creation of inset floodplains, high flow channels, and placement of instream large woody debris. Pilot remediation permitting and implementation projects are planned for 2016-2018. Full scale remediation and restoration permitting will proceed with larger-scale actions to be initiated in approximately 2020. Monitoring and maintenance is anticipated for an extended period (e.g., ten to twenty years) following completion of remediation efforts.

Watershed Stewardship Program: This is a non-regulatory, participatory program that engages residents, community members, scientists, land owners, land managers, and regulatory agencies in developing a collaborative planning process that seeks to enhance conditions in the Elk River Watershed. The Elk River Watershed Stewardship Program will work to accomplish the following goals:

- a. Seek common ground among diverse participants.
- b. Identify strategies and solutions to:
 - i. Improve the hydrologic, water quality, and habitat conditions of Elk River;
 - ii. Reduce nuisance flooding and improve public transportation routes during high water conditions; and
 - iii. Improve residential and agricultural water supplies.
- c. Promote coordinated science and monitoring.

In 2016, a steering committee comprised of Humboldt County, University of California Cooperative Extension, Natural Resources Conservations Services, CalTrout, and the Regional Water Board will initiate the Elk River Watershed Stewardship Program. Initial program funding is provided by 319(h) grant funds from the US EPA and will support the stewardship efforts through 2018.

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Table 4: Upper Elk River Sediment TMDL Implementation Actions[†]		
Topic	Responsible Parties	Actions
Sediment Source Control	Humboldt Redwood Company	Humboldt Redwood Company shall implement its revised WDRs adopted by the Regional Water Board to implement phase 1 of the Upper Elk River Sediment TMDL and a zero load allocation.
Sediment Source Control	Green Diamond Resource Company	Green Diamond Resource Company shall implement its South Fork Elk management plan including any revisions approved by the Regional Water Board to implement phase 1 of the Upper Elk River Sediment TMDL and a zero sediment load allocation.
Sediment Source Control	Non-Industrial Timberland Owners	Prior to any timberland management activities, non-industrial timberland owners shall enroll under the General NTMP WDR in Tier B (Order No. R1-2013-0005 General Waste Discharge Requirements for Discharges for Timber Operations on NTMPs) or a future Order that replaces Order No. R1-2013-0005.
Sediment Source Control	Other Timberland Owners	For other timber harvest plans, landowners shall enroll individual THPs under the General Timber WDRs (Order No. 2004-0030) or a future Order that replaces Order No. R1-2004-0030 and incorporate any additional conditions identified during the timber review process as necessary to be consistent with the TMDL Action Plan.
Sediment Source Control	Bureau of Land Management	The Bureau of Land Management shall request enrollment of any projects with potential sediment discharges under the U.S. Forest Service Waiver (Order No. R1-2015-0021) or a future Order that replaces Order No. R1-2015-0021.
Sediment Remediation	CalTrout	By 2017, CalTrout will produce a final report detailing the results of full-scale sediment and hydrodynamic modeling, including feasible remediation and restoration activities sufficient to achieve water quality standards and return the watershed to a trajectory of recovery.
Watershed Stewardship	Humboldt County, the Steering Committee, and the Watershed Stewardship Program	By 2016, in coordination with a steering committee, Humboldt County will initiate a watershed stewardship program for the Elk River Watershed in conformance with the 319(h) grant contract, including establishment of: a Health and Safety workgroup responsible for developing recommendations appropriate for resolving water supply, flooding, and road access issues; a Science and Coordinated Monitoring workgroup responsible for developing recommendations appropriate for improving the effectiveness of water quality, sediment and flow monitoring efforts throughout the watershed; a Sediment Remediation workgroup responsible for developing recommendations appropriate for remediating instream stored sediment and improving floodwater conveyance, sediment transport, and ecosystem function. Final reports documenting the workgroup's recommendations, including plans and schedules are due in 2018.

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Table 4: Upper Elk River Sediment TMDL Implementation Actions[†]

Topic	Responsible Parties	Actions
TMDL and Watershed Stewardship Effectiveness	Regional Water Board	By 2021, the Regional Water Board shall evaluate the available information to assess the degree to which the efforts of the Watershed Stewardship Program are making sufficient progress towards achievement of health and safety, coordinated monitoring, and sediment remediation improvements. By 2026, the Regional Water Board shall evaluate the available information to assess the degree to which recommended health and safety, coordinated monitoring, and sediment remediation improvements have been achieved. By 2031, the Regional Water Board shall evaluate the available information to assess the degree to which water quality objectives are attained and beneficial uses are restored throughout the watershed, and nuisance flooding conditions are abated.
TMDL and Watershed Stewardship Effectiveness	Regional Water Board	By 2031 or upon attainment of water quality objectives, the Regional Water Board shall re-evaluate the sediment loading capacity and load allocation for the Upper Elk River Watershed and revise accordingly.

The zero load allocation does not constitute an effluent limitation or a waste load allocation, and the Board has discretion on how to implement it in WDRs, waivers or other actions to reduce and eliminate waste discharges.

VII. Monitoring and Adaptive Management

The Program of Implementation relies on coordinated monitoring and adaptive management as the basis for tracking trends, updating scientific understanding, and modifying implementation actions over time.

The Regional Water Board has identified four primary goals for near and long-term monitoring in the Elk River: (1) evaluate compliance with WDR/waiver requirements and verify that the provisions of the WDRs are being implemented as designed and permitted; (2) evaluate the effectiveness of management measures, management modifications, and remediation efforts aimed at reducing sediment loads and improving conditions in the impacted reaches; (3) track whether conditions are trending toward numeric targets, water quality objectives, and beneficial use support via the Watershed Stewardship Program; and (4) inform when and how to reevaluate the loading capacity.

A combination of monitoring resources is anticipated to achieve these goals. The WDRs will require monitoring and reporting from the landowners in the Upper Elk River Watershed. The Elk River Recovery Assessment will provide reach-scale targets defining channel and habitat conditions. In addition, pilot remediation projects will be implemented as part of the Elk River Recovery Assessment, including effectiveness monitoring to assess which techniques should be brought full-scale. Finally, the Science and Coordinated Monitoring workgroup of the Watershed Stewardship Program will recommend monitoring and special studies as necessary to address the resource protection goals of the group and answer specific questions.

Regional Water Board staff will report to the Regional Water Board annually on the status and progress of implementation activities. Approximately five years after adoption, Regional Water Board staff will conduct a formal assessment of the effectiveness of the implementation plan and make any necessary revisions to this TMDL Action Plan. This includes a review of the sediment source analysis for the Upper Elk River, sediment deposition in the impacted reach and Lower Elk River, and the need for a Lower Elk River sediment TMDL, using Recovery Assessment tools and other available data, as appropriate.

During reassessment, the Regional Water Board will consider how effective the requirements of the TMDL program of implementation are at meeting the TMDL, achieving water quality objectives, and protecting the beneficial uses of water in the Upper Elk River Watershed. The success of the TMDL will be assessed based on water quality trends in the Upper Elk River Watershed, particularly the attainment of water quality standards in the impacted reach. Ultimately success is achieved when nuisance conditions are abated, and beneficial uses are supported.

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4.2.13 Action Plan To Address Elevated Water Temperatures In The Eel River Watershed

The USEPA has established Total Maximum Daily Loads (TMDL) for elevated temperature in the Upper Main Eel, Middle Main Eel, Lower Main Eel, South Fork Eel, North Fork Eel, and Middle Fork Eel River Watersheds³⁴. All of those temperature TMDLs have assigned temperature load allocations corresponding to solar radiation loads that occur when the riparian vegetation is at full potential growth conditions, with allowances for the effects of natural factors that act to reduce those potential growth conditions. The goal of this Action Plan is to establish actions that achieve those TMDL load allocations. The following actions constitute the program of implementation to achieve the Eel River Watershed Temperature TMDLs and are consistent with the *Policy for the Implementation of the Water Quality Objectives for Temperature*.

Table 4-19: Actions to Address Temperature Impairments in the Eel River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
<u>Timber Harvest Activities on Non-Federal Lands</u> Regional Water Board	<u>Action</u> Regional Water Board staff shall make recommendations for additional measures to ensure the TMDL load allocations and water quality objectives for temperature are achieved during the timber harvest review process, as necessary. <u>Timeline</u> Ongoing
<u>Timber Harvest Activities on Non-Federal Lands</u> Parties conducting timber harvest activities that discharge waste or have the potential to discharge waste	<u>Action</u> Implement riparian management measures that meet the riparian shade allocations and water quality standards. Where the Forest Practice Rules are not sufficient to meet the TMDL allocations or water quality standards, implement additional measures as directed by Regional Water Board staff during the timber harvest review process. <u>Timeline</u> Ongoing
<u>All Activities on USFS Lands</u> Regional Water Board	<u>Action</u> Implement Order No. R1-2010-0029, <i>Waiver of Waste Discharge Requirements for Nonpoint Source Discharges Related to Certain Federal Land Management Activities on National Forest System Lands in the North Coast Region</i> , and any future revisions, (USFS Waiver of WDRs) as a mechanism for compliance with the water quality objectives for temperature. <u>Action</u> Regional Water Board staff shall make recommendations for additional measures to ensure the water quality objective for temperature is achieved during the project review process, as necessary. <u>Timeline</u>

³⁴ *Upper Main Eel River and Tributaries (including Tomki Creek, Outlet Creek and Lake Pillsbury) Total Maximum Daily Loads for Temperature and Sediment (2004), Middle Main Eel River and Tributaries (from Dos Rios to South Fork) Total Maximum Daily Loads for Temperature and Sediment (2005), Lower Eel River Total Maximum Daily Loads for Temperature and Sediment (2007), South Fork Eel River Total Maximum Daily Loads for Sediment and Temperature (1999), North Fork Eel River Total Maximum Daily Loads for Sediment and Temperature (2002), and Middle Fork Eel River Total Maximum Daily Loads for Sediment and Temperature (2003)*, each contain a problem statement, source analysis, numeric targets, load allocations, linkage analysis, and margin of safety. Please see the individual TMDL documents for more information.

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Table 4-19: Actions to Address Temperature Impairments in the Eel River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
	Ongoing
<u>All Activities on Lands Managed by the USFS</u> USFS	<p><u>Action</u> Conduct land management activities in compliance with the USFS Waiver of WDRs and in accordance with project-level recommendations.</p> <p><u>Timeline</u> As required in the USFS Waiver of WDRs.</p>
<u>Agricultural Activities on Non-Federal Lands</u> Regional Water Board	<p><u>Action</u> Develop and implement the Agricultural Lands Discharge Program as a mechanism for compliance with temperature objectives.</p> <p><u>Timeline</u> Upon adoption</p>
<u>Agricultural Activities on Non-Federal Lands</u> Parties conducting activities associated with agriculture that discharge waste or have the potential to discharge waste on nonfederal land, except dairies.	<p><u>Action</u> Implement riparian management measures that meet the riparian shade load allocations and water quality standards.</p> <p><u>Timeline</u> Ongoing</p> <p><u>Action</u> Conduct land management activities in compliance with the Agricultural Lands Discharge Program when adopted.</p> <p><u>Timeline</u> Upon adoption of the Agricultural Lands Discharge Program</p>
<u>Road Construction and Maintenance of State Highway Facilities</u> State Water Resources Control Board Regional Water Board	<p><u>Action</u> Implement the NPDES Statewide Storm Water Permit and Waste Discharge Requirements for the State of California, Department of Transportation (Caltrans permit).</p> <p><u>Timeline</u> Ongoing</p>
<u>Road Construction and Maintenance of State Highway Facilities</u> Caltrans	<p><u>Action</u> Conduct road construction, maintenance and associated activities in compliance with the Caltrans permit.</p> <p><u>Timeline</u> Ongoing</p>

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Table 4-19: Actions to Address Temperature Impairments in the Eel River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
<u>Road Construction and Associated Maintenance on County Lands</u> Regional Water Board	<u>Action</u> Implement Order No. R1-2013-0004, <i>Waiver of Waste Discharge Requirements and General Water Quality Certification for County Road Management and Activities Conducted Under the Five Counties Salmonid Conservation Program In the Counties of Del Norte, Humboldt, Mendocino, Siskiyou, and Trinity in The North Coast Region</i> (5C Waiver of WDRs), and any future revisions. <u>Action</u> In the event that a county does not show intent to implement the 5C Waiver of WDRs, develop WDRs or a conditional waiver of WDRs for that county. <u>Timeline</u> Ongoing
<u>Road Construction and Maintenance on County Lands</u> Humboldt, Mendocino, and Trinity Counties	<u>Action</u> Conduct road construction and maintenance in compliance with the 5C Waiver of WDRs. <u>Timeline</u> Pursuant to the 5C Waiver of WDRs timelines.
<u>Dairy Operations</u> Regional Water Board	<u>Action</u> Implement temperature allocations through the Water Quality Compliance Program for Dairies & Concentrated Animal Feeding Operations (Dairy Program), and any future revisions. <u>Timeline</u> Ongoing
<u>Dairy Operations</u> Dairy operators	<u>Action</u> Conduct land management activities in compliance with the Dairy Program. <u>Timeline</u> Ongoing
<u>Dredge and Fill Activities in Waters of the State</u> Regional Water Board	<u>Action</u> Incorporate measures to meet the temperature allocations in 401 water quality certifications. <u>Timeline</u> Ongoing
<u>Waste Discharge Requirement Program</u> Regional Water Board	<u>Action</u> Incorporate measures to meet the temperature allocations and water quality objectives for temperature in Waste Discharge Requirements and Waivers thereof. <u>Timeline</u> Ongoing

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Table 4-19: Actions to Address Temperature Impairments in the Eel River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
<p>Water Use</p> <p>Regional Water Board</p> <p>State Water Resources Control Board, Division of Water Rights</p>	<p><u>Action</u> Work with other agencies and non-governmental organizations to support off-stream storage projects for water diverters currently diverting directly from streams during summer. Work with other agencies and non-governmental organizations to streamline the permitting process for conversion of on-stream to off-stream storage.</p> <p><u>Timeline</u> Ongoing</p>
<p>Water Use</p> <p>Water users</p>	<p><u>Action</u> The Regional Water Board encourages all water users to implement water conservation practices and develop off-stream storage facilities to minimize water diversions during low flow periods.</p> <p><u>Timeline</u> Ongoing</p>
<p>Water Use</p> <p>Regional Water Board</p> <p>State Water Resources Control Board, Division of Water Rights</p>	<p><u>Action</u> Pursue instream flow studies, including the following actions:</p> <ul style="list-style-type: none"> • Work with other agencies and non-governmental organizations to support instream flow studies to: (1) quantify flows necessary for beneficial use support, (2) quantify flow impacts to assist outreach and education efforts, or (3) identify opportunities to increase summer low flows. • Coordinate with the California Department of Fish and Wildlife on the development, methodologies, and any criteria relevant to instream flow studies. • Consider all sources of water, including headwaters, groundwater, and waters flowing in subterranean streams. <p><u>Timeline</u> Until complete</p>
<p>Water Use</p> <p>Regional Water Board</p> <p>State Water Resources Control Board, Division of Water Rights</p>	<p><u>Action</u> Support third-party efforts to address temperature related concerns, including:</p> <ul style="list-style-type: none"> • Education of water users on the importance of water conservation efforts, • Education of water users on water conservation practices and opportunities, • Assistance for water users in the implementation of water conservation practices, • Restoration of riparian vegetation, • Other efforts that address water temperature-related concerns. <p><u>Timeline</u> Ongoing</p>

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Table 4-19: Actions to Address Temperature Impairments in the Eel River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
<u>Water Use</u> Regional Water Board	<u>Action</u> Continue to coordinate with the State Water Board's Division of Water Rights by participating in the water right application and petition process, providing monitoring recommendations, conducting joint inspections as appropriate, submitting data in support of 401 certifications related to water diversions and/or facilities regulated by the FERC, participating in instream flow studies, participating in proceedings related to instream flow, and participating by any other appropriate means to help ensure that the terms of water right permits and licenses are consistent with the intrastate water quality objective for temperature. <u>Timeline</u> Ongoing

4.2.14 Action Plan To Address Elevated Water Temperatures In The Navarro River Watershed

The USEPA has established Total Maximum Daily Loads (TMDL) for elevated temperature in the Navarro³⁵. The Navarro River Watershed Temperature TMDL has assigned temperature load allocations corresponding to solar radiation loads that occur when the riparian vegetation is at full potential growth conditions, with allowances for the effects of natural factors that act to reduce those potential growth conditions. The goal of this Action Plan is to establish actions that achieve those TMDL load allocations. The Navarro River Watershed Temperature TMDL also identifies the alteration of flow as a factor that may elevate water temperatures in some situations, and sets a target of no increases in diverted flows unless it can be demonstrated that the flow reduction will not increase water temperatures. The following actions constitute a program of implementation to achieve the Navarro River Watershed Temperature TMDL and are consistent with the *Policy for the Implementation of the Water Quality Objectives for Temperature*.

Table 4-20: Actions to Address Temperature Impairments in the Navarro River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
<u>Timber Harvest Activities on Non-Federal Lands</u> Regional Water Board	<u>Action</u> Regional Water Board staff shall make recommendations for additional measures to ensure the TMDL load allocations and water quality objectives for temperature are achieved during the timber harvest review process, as necessary. <u>Timeline</u> Ongoing

³⁵ The *Navarro River Total Maximum Daily Loads for Temperature and Sediment* (2000) contains a problem statement, source analysis, , numeric targets, load allocations, linkage analysis, and margin of safety. Please see the TMDL and supporting documents for more information.

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Table 4-20: Actions to Address Temperature Impairments in the Navarro River Watershed

<p><u>Source or Land Use Activity</u> and Responsible Party</p>	<p><u>Implementation Actions</u></p>
<p><u>Timber Harvest Activities on Non-Federal Lands</u></p> <p>Parties conducting timber harvest activities that discharge waste or have the potential to discharge waste.</p>	<p><u>Action</u> Implement riparian management measures that meet the riparian shade allocations and water quality standards. Where the Forest Practice Rules are not sufficient to meet the TMDL allocations or water quality standards, implement additional measures as directed by Regional Water Board staff during the timber harvest review process.</p> <p><u>Timeline</u> Ongoing</p>
<p><u>Agricultural Activities on Non-Federal Lands</u></p> <p>Regional Water Board</p>	<p><u>Action</u> Develop and implement the Agricultural Lands Discharge Program as a mechanism for compliance with temperature objectives.</p> <p><u>Timeline</u> Upon adoption</p>
<p><u>Agricultural Activities on Non-Federal Lands</u></p> <p>Parties conducting activities associated with agriculture that discharge waste or have the potential to discharge waste on nonfederal land, except dairies.</p>	<p><u>Action</u> Implement riparian management measures that meet the riparian shade load allocations and water quality standards.</p> <p><u>Timeline</u> Ongoing</p> <p><u>Action</u> Conduct land management activities in compliance with the Agricultural Lands Discharge Program when adopted.</p> <p><u>Timeline</u> Upon adoption of the Agricultural Lands Discharge Program</p>
<p><u>Road Construction and Maintenance of State Highway Facilities</u></p> <p>State Water Resources Control Board</p> <p>Regional Water Board</p>	<p><u>Action</u> Implement the NPDES Statewide Storm Water Permit and Waste Discharge Requirements for the State of California, Department of Transportation (Caltrans permit).</p> <p><u>Timeline</u> Ongoing</p>
<p><u>Road Construction and Maintenance of State Highway Facilities</u></p> <p>Caltrans</p>	<p><u>Action</u> Conduct road construction, maintenance and associated activities in compliance with the Caltrans permit.</p> <p><u>Timeline</u> Ongoing</p>

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Table 4-20: Actions to Address Temperature Impairments in the Navarro River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
<u>Road Construction and Associated Maintenance on County Lands</u> Regional Water Board	<u>Action</u> Implement Order No. R1-2013-0004, <i>Waiver of Waste Discharge Requirements and General Water Quality Certification for County Road Management and Activities Conducted Under the Five Counties Salmonid Conservation Program In the Counties of Del Norte, Humboldt, Mendocino, Siskiyou, and Trinity in The North Coast Region</i> (5C Waiver of WDRs) and any future revisions. <u>Action</u> In the event that a county does not show intent to implement the 5C Waiver of WDRs, develop WDRs or a conditional waiver of WDRs for that county. <u>Timeline</u> Ongoing
<u>Road Construction and Maintenance on County Lands</u> Mendocino County	<u>Action</u> Conduct road construction and maintenance in compliance with the 5C Waiver of WDRs. <u>Timeline</u> Pursuant to the 5C Waiver of WDRs timelines
<u>Dredge and Fill Activities in Waters of the State</u> Regional Water Board	<u>Action</u> Incorporate measures to meet the temperature allocations in 401 water quality certifications. <u>Timeline</u> Ongoing
<u>Waste Discharge Requirement Program</u> Regional Water Board	<u>Action</u> Incorporate measures to meet the temperature allocations and water quality objectives for temperature in Waste Discharge Requirements and Waivers thereof. <u>Timeline</u> Ongoing
<u>Water Use</u> Regional Water Board State Water Resources Control Board, Division of Water Rights	<u>Action</u> Work with other agencies and non-governmental organizations to support off-stream storage projects for water diverters currently diverting directly from streams during summer. Work with other agencies and non-governmental organizations to streamline the permitting process for conversion of on-stream to off-stream storage. <u>Timeline</u> Ongoing
<u>Water Use</u> Water users	<u>Action</u> The Regional Water Board encourages all water users to implement water conservation practices and develop off-stream storage facilities to minimize water diversions during low flow periods. <u>Timeline</u> Ongoing

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Table 4-20: Actions to Address Temperature Impairments in the Navarro River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
<u>Water Use</u> Regional Water Board State Water Resources Control Board, Division of Water Rights	<u>Action</u> Pursue instream flow studies, including the following actions: <ul style="list-style-type: none"> • Work with other agencies and non-governmental organizations to support instream flow studies to: (1) quantify flows necessary for beneficial use support, (2) quantify flow impacts to assist outreach and education efforts, or (3) identify opportunities to increase summer low flows. • Coordinate with the California Department of Fish and Wildlife on the development, methodologies, and any criteria relevant to instream flow studies. • Consider all sources of water, including headwaters, groundwater, and waters flowing in subterranean streams. <u>Timeline</u> Until complete
<u>Water Use</u> Regional Water Board State Water Resources Control Board, Division of Water Rights	<u>Action</u> Support third-party efforts to address temperature related concerns, including: <ul style="list-style-type: none"> • Education of water users on the importance of water conservation efforts, • Education of water users on water conservation practices and opportunities, • Assistance for water users in the implementation of water conservation practices, • Restoration of riparian vegetation, • Other efforts that address water temperature-related concerns. <u>Timeline</u> Ongoing
<u>Water Use</u> Regional Water Board State Water Resources Control Board, Division of Water Rights	<u>Action</u> Take actions to address the temperature impacts of marijuana cultivation, through the following: <ul style="list-style-type: none"> • Outreach and education, • Grant support for water conservation and pollution control efforts, • Coordination with other agencies, • Enforcement actions. <u>Timeline</u> Ongoing
<u>Water Use</u> Regional Water Board	<u>Action</u> Continue to coordinate with the State Water Board's Division of Water Rights by participating in the water right application and petition process, providing monitoring recommendations, conducting joint inspections as appropriate, submitting data in support of 401 certifications related to water diversions and/or facilities regulated by the FERC, participating in instream flow studies, participating in proceedings related to instream flow, and any other appropriate means to help ensure that the terms of water right permits and licenses are consistent with the intrastate water quality objective for temperature. <u>Timeline</u> Ongoing

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Table 4-20: Actions to Address Temperature Impairments in the Navarro River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
<u>Water Use</u> State Water Resources Control Board, Division of Water Rights	<u>Action</u> Achieve the Flow and Temperature target contained in the Navarro River Watershed Temperature TMDL through implementation of the <i>Policy for Maintaining Instream Flows in Northern California Coastal Streams</i> . <u>Timeline</u> Ongoing

4.2.15 Action Plan To Address Elevated Water Temperatures In The Mattole River Watershed

The USEPA has established a Total Maximum Daily Load (TMDL) for elevated temperature in the Mattole River Watershed³⁶. The Mattole River Watershed Temperature TMDL has assigned temperature load allocations corresponding to solar radiation loads that occur when the riparian vegetation is at full potential growth conditions, with allowances for the effects of natural factors that act to reduce those potential growth conditions. The goal of this Action Plan is to establish actions that achieve those TMDL load allocations. The following actions constitute a program of implementation to achieve the Mattole River Watershed Temperature TMDL and are consistent with the *Policy for the Implementation of the Water Quality Objectives for Temperature*.

Table 4-21: Action Plan to Address Temperature Impairments in the Mattole River Watershed

<u>Source or Land Use Activity</u> and Responsible Party	<u>Implementation Actions</u>
<u>Timber Harvest Activities on Non-Federal Lands</u> Regional Water Board	<u>Action</u> Regional Water Board staff shall make recommendations for additional measures to ensure the TMDL load allocations and water quality objectives for temperature are achieved during the timber harvest review process, as necessary. <u>Timeline</u> Ongoing
<u>Timber Harvest Activities on Non-Federal Lands</u> Parties conducting timber harvest activities that discharge waste or have the potential to discharge waste	<u>Action</u> Implement riparian management measures that meet the riparian shade allocations and water quality standards. Where the Forest Practice Rules are not sufficient to meet the TMDL allocations or water quality standards, implement additional measures as directed by Regional Water Board staff during the timber harvest review process. <u>Timeline</u> Ongoing
<u>Agricultural Activities on Non-Federal Lands</u> Regional Water Board	<u>Action</u> Develop and implement the Agricultural Lands Discharge Program as a mechanism for compliance with temperature objectives. <u>Timeline</u> Upon adoption

³⁶ The *Mattole River Total Maximum Daily Loads for Sediment and Temperature* (2002) contains a problem statement, source analysis, numeric targets, load allocations, linkage analysis, and margin of safety. Please see the individual TMDL document for more information.

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Table 4-21: Action Plan to Address Temperature Impairments in the Mattole River Watershed

<u>Source or Land Use Activity and Responsible Party</u>	<u>Implementation Actions</u>
<p><u>Agricultural Activities on Non-Federal Lands</u></p> <p>Parties conducting activities associated with agriculture that discharge waste or have the potential (continued) to discharge waste on nonfederal land, except dairies.</p>	<p><u>Action</u> Implement riparian management measures that meet the riparian shade load allocations and water quality standards.</p> <p><u>Timeline</u> Ongoing</p> <p>(continued)</p> <p><u>Action</u> Conduct land management activities in compliance with the Agricultural Lands Discharge Program when adopted.</p> <p><u>Timeline</u> Upon adoption of the Agricultural Lands Discharge Program</p>
<p><u>Road Construction and Associated Maintenance on County Lands</u></p> <p>Regional Water Board</p>	<p><u>Action</u> Implement Order No. R1-2013-0004, <i>Waiver of Waste Discharge Requirements and General Water Quality Certification for County Road Management and Activities Conducted Under the Five Counties Salmonid Conservation Program In the Counties of Del Norte, Humboldt, Mendocino, Siskiyou, and Trinity in The North Coast Region</i> (5C Waiver of WDRs).</p> <p><u>Action</u> In the event that a county does not show intent to implement the 5C Waiver of WDRs, develop WDRs or a conditional waiver of WDRs for that county.</p> <p><u>Timeline</u> Ongoing</p>
<p><u>Road Construction and Maintenance on County Lands</u></p> <p>Humboldt and Mendocino Counties</p>	<p><u>Action</u> Conduct road construction and maintenance in compliance with the 5C Waiver of WDRs.</p> <p><u>Timeline</u> Pursuant to the 5C Waiver of WDRs timelines.</p>
<p><u>Dredge and Fill Activities in Waters of the State</u> (continued)</p> <p>Regional Water Board</p>	<p><u>Action</u> Incorporate measures to meet the temperature allocations in 401 water quality certifications.</p> <p><u>Timeline</u> Ongoing</p>
<p><u>Waste Discharge Requirement Program</u></p> <p>Regional Water Board</p>	<p><u>Action</u> Incorporate measures to meet the temperature allocations and water quality objectives for temperature in Waste Discharge Requirements and Waivers thereof.</p> <p><u>Timeline</u> Ongoing</p>

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Table 4-21: Action Plan to Address Temperature Impairments in the Mattole River Watershed

<u>Source or Land Use Activity and Responsible Party</u>	<u>Implementation Actions</u>
<p>Water Use</p> <p>Regional Water Board</p> <p>State Water Resources Control Board, Division of Water Rights</p>	<p><u>Action</u> Work with other agencies and non-governmental organizations to support off-stream storage projects for water diverters currently diverting directly from streams during summer. Work with other agencies and non-governmental organizations to streamline permitting process for conversion of on-stream to off-stream storage.</p> <p><u>Timeline</u> Ongoing</p>
<p>Water Use</p> <p>Water users</p>	<p><u>Action</u> The Regional Water Board encourages all water users to implement water conservation practices and develop off-stream storage facilities to minimize water diversions during low flow periods.</p> <p><u>Timeline</u> Ongoing</p>
<p>Water Use</p> <p>Regional Water Board</p> <p>State Water Resources Control Board, Division of Water Rights</p>	<p><u>Action</u> Pursue instream flow studies, including the following actions:</p> <ul style="list-style-type: none"> • Work with other agencies and non-governmental organizations to support instream flow studies to: (1) quantify flows necessary for beneficial use support, (2) quantify flow impacts to assist outreach and education efforts, or (3) identify opportunities to increase summer low flows. • Coordinate with the California Department of Fish and Wildlife on the development, methodologies, and any criteria relevant to instream flow studies. • Consider all sources of water, including headwaters, groundwater, and waters flowing in subterranean streams. <p><u>Timeline</u> Until complete</p>
<p>Water Use</p> <p>Regional Water Board</p> <p>State Water Resources Control Board, Division of Water Rights</p>	<p><u>Action</u> Support third-party efforts to address temperature related concerns, including:</p> <ul style="list-style-type: none"> • Education of water users on the importance of water conservation efforts, • Education of water users on water conservation practices and opportunities, • Assistance for water users in the implementation of water conservation practices, • Restoration of riparian vegetation, • Other efforts that address water temperature-related concerns. <p><u>Timeline</u> Ongoing</p>

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Table 4-21: Action Plan to Address Temperature Impairments in the Mattole River Watershed

<u>Source or Land Use Activity and Responsible Party</u>	<u>Implementation Actions</u>
<p>Water Use</p> <p>Regional Water Board</p> <p>(continued) State Water Resources Control Board, Division of Water Rights</p>	<p><u>Action</u> Take actions to address the temperature impacts of marijuana cultivation, through the following:</p> <ul style="list-style-type: none"> • Outreach and education, • Grant support for water conservation and pollution control efforts, • Coordination with other agencies, • Enforcement actions. <p><u>Timeline</u> Ongoing</p>
<p>Water Use</p> <p>Regional Water Board</p>	<p><u>Action</u> Continue to coordinate with the State Water Board's Division of Water Rights by participating in the water right application and petition process, providing monitoring recommendations, conducting joint inspections as appropriate, submitting data in support of 401 certifications related to water diversions and/or facilities regulated by the FERC, participating in instream flow studies, participating in proceedings related to instream flow, and any other appropriate means to help ensure that the terms of water right permits and licenses are consistent with the intrastate water quality objective for temperature.</p> <p><u>Timeline</u> Ongoing</p>

APPENDIX 1 BASIN PLAN AMENDMENTS
