SUBSTITUTE ENVIRONMENTAL DOCUMENT

Policy for Maintaining Instream Flows in Northern California Coastal Streams

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Division of Water Rights
State Water Resources Control Board
California Environmental Protection Agency

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Substitute Environmental Document

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Summary

The State Water Resources Control Board (State Water Board) proposes to adopt a Policy for Maintaining Instream Flows in Northern California Coastal Streams (North Coast Instream Flow Policy or Policy). This document provides information regarding the potential environmental effects of adopting and, to the extent that the effects are reasonably foreseeable, implementing the proposed Policy.

Proposed Activity

The North Coast Instream Flow Policy focuses on measures to protect native fish populations, with a particular focus on anadromous salmonids and their habitat. It is intended to protect the environment by ensuring that water rights are administered in a manner designed to maintain instream flows in the area covered by the Policy (Policy Area). The Policy Area covers 3.1 million watershed acres in portions of Humboldt, Mendocino, and Napa counties, and all of Sonoma and Marin counties. The anadromous salmonids in the Policy Area include distinct populations of coho salmon, Chinook salmon, and steelhead.

The proposed Policy establishes "regionally protective criteria" to be used in establishing requirements for maintaining instream flows in streams and rivers in the Policy Area. As discussed further below, these regionally protective criteria are defined in terms of:

- diversion season,
- minimum bypass flow,
- maximum cumulative diversion, and
- permitting of onstream dams.

The proposed Policy contains guidelines for evaluating whether a proposed water diversion, in combination with existing diversions in a watershed, may affect instream flows needed for the protection of fishery resources. The Policy does not establish specific instream flows requirements; rather, it lays out requirements for applicants to follow in applying to appropriate water, small domestic use and livestock stockpond registrations, and water right petitions. It also restricts the construction of new dams and requires modifications for fish ladders, screening, and passive bypass systems at existing dams under specified circumstances.

The Policy is intended to provide guidance to the regulated community and to State Water Board staff. The State Water Board will use the adopted Policy to consider and maintain instream flows when making decisions related to water diversions and uses in the Policy Area. Enforcement requirements include a framework for compliance assurance, prioritization of enforcement cases, and descriptions of enforcement actions. Through a number of provisions, the Policy allows for flexibility in compliance. Site-specific studies may be conducted to evaluate whether alternative protective criteria may be applied (Policy, section 4.1.8). The Policy also provides for a watershed-based approach to evaluate the effects of multiple diversions on instream flows within a watershed as an alternative to evaluating water diversion projects on an individual basis (Policy, section 12.0). The proposed Policy also allows exceptions on a case-by-case basis (Policy, section 13.0).

Consideration of Alternatives

Alternatives to the proposed Policy were considered, including the "No Policy Alternative," the adoption of the existing draft instream flow guidelines promulgated by the California Department of Fish and Game (CDFG) and the National Marine Fisheries Service (NMFS) in 2002 (CDFG-NMFS Draft Guidelines), and a "Maximum Protectiveness Alternative." A number of alternative Policy elements were evaluated in selecting those that comprise the proposed Policy. A major factor in evaluating the various Policy alternatives was the concept of "protectiveness" – i.e., the degree to which a possible Policy element protects fishery resources, including habitat. Because the alternatives allow flexibility in compliance, and because the responses by the regulated community cannot be predicted with reasonable certainty, comparisons among the alternatives do not lead to clear differences in terms of the potential, indirect environmental effects of Policy implementation.

Programmatic Impact Assessment

The assessment of environmental effects in this substitute document was conducted at a programmatic level, which is more general than a project-specific analysis. The assessment was also conservative, in that if any reasonably foreseeable outcome of implementing the Policy for any one water diversion project could conceivably have a significant indirect effect on an environmental resource, then the effect was judged to be significant in all cases.

Potential effects on environmental resource areas were considered in terms of the possible responses of affected persons. The assessment was also conducted by defining categories of actions that people might take in response to implementation of the Policy that could have indirect environmental impacts. In particular, instead of pursuing a water right application under the Policy, people may choose to develop water diversion projects under other bases of right. How people will respond to the implementation of the Policy, and where and when these actions may occur, cannot be predicted with certainty; however, for purposes of this assessment, the following actions that may be taken by people to develop diversions of water under other bases of right are defined in terms of:

- increasing groundwater extraction and use,
- increasing diversions under claim of riparian rights,
- relying on other alternative water sources and water conservation,
- removing or modifying onstream storage and regulatory dams, and
- constructing new and expanding existing offstream storage facilities.

Thus, the indirect impacts of complying with the Policy and developing alternate water supplies are assessed for their potential to result in effects to the environment.

Environmental Effects of the Proposed Policy

The adoption of the proposed Policy would not result in any direct environmental effects. All potential environmental effects are indirect effects associated with implementation, which would occur later in time and would be subject to project-specific environmental review.

Potentially significant indirect impacts were identified in nearly all environmental resource areas. This analytical outcome is consistent with a programmatic, conservative analysis. Potentially significant, indirect impacts were identified in the areas of aesthetics, agriculture resources, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use planning, noise, public services, recreation, transportation and traffic, and utilities and service systems.

As stated above, key concept in developing the Policy, including the "regionally protective" criteria, is the concept of "protectiveness" – e.g., maintaining instream flow for the protection of anadromous fish resources, including habitat. Each Policy element was selected for inclusion in the proposed Policy to allow for the greatest amount of diversion while still protecting instream flows. In terms of environmental impacts, implementation of a policy that is based on this concept is expected to result in beneficial effects to anadromous salmonids and their habitat. In addition to anadromous salmonids, "protectiveness" was also considered for other biota; however, what is beneficial for one species or for the ecosystem as a whole may not necessarily be beneficial for all species. To the extent that implementation of the Policy results in emulating natural flow variability as closely as possible, salmonids would be expected to benefit, and the chances of adversely affecting other species would be expected to be reduced.

The analysis considered the environmental effects of the various Policy elements, including the potential impacts related to modification or removal of onstream dams. The removal of onstream dams would be associated with a wide array of indirect effects on the environment. Depending on the location of the dam, affected resource, and the nature of the impact, the effect could be beneficial or adverse, short-term or long-term.

One component of the impact assessment was a "water cost analysis," which provides an indication of the relative degree to which three alternative Policy elements—maximum cumulative diversion, minimum bypass flow, and season of diversion—may limit the volume of water available for diversion compared with other alternative elements. Generally, the Policy alternatives that are more restrictive towards water diversions would be associated with more indirect environmental effects resulting from persons using alternative means of diversion, such as riparian use or groundwater pumping. The results of the water cost analysis show that, of the three Policy elements, the maximum cumulative diversion has the most important influence on how much water is made potentially available for diversion, followed by the minimum bypass flow. Season of diversion was found to have the least influence on the volume of water that is made potentially available for diversion. The combination of elements that make up the proposed Policy is not the most restrictive in terms of the volume of water that is potentially available for diversion; implementation of the CDFG-NMFS Draft Guidelines on average would restrict the volume of water available for diversion by as much as two times more. When the proposed Policy criteria are applied, however, they are more protective of instream flows than the CDFG-NMFS Draft Guidelines.

Individual water right applications and petitions will be further evaluated under CEQA at a project-specific level by the State Water Board or, depending on the proposed project, by another lead agency. Future environmental reviews can be expected to identify project-specific environmental effects; the lead agency must identify any project-specific environmental effects and either mitigate them to less-than-significant levels or adopt a statement of overriding considerations for approving the project despite the potential for significant environmental impacts.

1 INTRODUCTION

1.1 Purpose of This Document

The State Water Resources Control Board (State Water Board) proposes to adopt a Policy for Maintaining Instream Flows in Northern California Coastal Streams (North Coast Instream Flow Policy or Policy). The proposed Policy focuses on measures to protect native fish populations, with a particular focus on anadromous salmonids and their habitat. In general, implementation of the Policy will protect the environment by ensuring that water rights are administered in a manner that maintains instream flows in the area covered by the Policy (Policy Area). This document provides information regarding the potential significant environmental effects of implementing the proposed Policy, to the extent those effects are reasonably foreseeable.

1.2 Statutory Basis for the Policy

Water Code section 1259.4, subdivision (a)(1), which was added by Assembly Bill 2121,[1] requires the State Water Board to adopt

> "principles and guidelines for maintaining instream flows in coastal streams from the Mattole River to San Francisco and in coastal streams entering northern San Pablo Bay, as part of state policy for water quality control adopted pursuant to Article 3 (commencing with Section 13140) of Chapter 3 of Division 7 [of the Water Code], for the purposes of water right administration."

Water Code section 1259.4, subdivision (b) states that, prior to the adoption of these principles and guidelines, the State Water Board may consider the draft "Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-California Coastal Streams" (CDFG-NMFS Draft Guidelines)[2] for the purposes of water right administration. These draft guidelines were issued jointly by the California Department of Fish and Game (CDFG) and the National Marine Fisheries Service (NMFS) in 2002, based on an early version promulgated in 2000. The CDFG-NMFS Draft Guidelines are discussed throughout this document, including in section 5.2.

1.3 CEQA Application

1.3.1 Basic Purposes of CEQA

When proposing to undertake or approve a discretionary project, state agencies must comply with the procedural and substantive requirements of the California Environmental Quality Act (CEQA).[3]

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[1] Stats. 2004, ch. 943, § 3.
[2] The CDFG-NMFS Draft Guidelines are available for review on the Internet at: http://swr.nmfs.noaa.gov/hcd/policies/Waterdiversion%20guidelines.pdf.
[3] California Public Resources Code, section 21000 et seq.

CEQA and the State CEQA Guidelines[4] establish procedures to be followed by state and local public agencies in analyzing and disclosing the environmental consequences of activities that an agency proposes to carry out or approve. CEQA applies to discretionary projects that may cause a direct or indirect physical change in the environment. As described in the CEQA Guidelines (§ 15002, subd. (a)), the basic purposes of CEQA are to:

> (1) Inform governmental decision makers and the public about the potential, significant environmental effects of proposed activities.
>
> (2) Identify ways that environmental damage can be avoided or significantly reduced.
>
> (3) Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.
>
> (4) Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

1.3.2 Requirements for Certified Programs

State regulatory programs that meet certain environmental standards and are certified by the Secretary of the California Resources Agency are exempt from CEQA's requirements for the preparation of environmental impact reports (EIR), negative declarations, and initial studies (Pub. Resources Code, § 21080.5). The CEQA Guidelines (§ 15251) contain a list of certified state regulatory programs. This list includes the Water Quality Control (Basin)/208 Planning Program[5] of the State Water Resources Control Board and the Regional Water Quality Control Boards (§ 15251, subd. (g)), as well as the regulatory program of the State Water Resources Control Board to establish instream beneficial use protection programs (§ 15251, subd. (k)). Accordingly, the adoption of state policy for water quality control is exempt from the CEQA requirement to prepare an EIR.

Agencies qualifying for such exemptions must still comply with CEQA's goals and policies, including the policy of avoiding significant adverse effects on the environment where feasible (§ 15250). Agencies must also evaluate environmental effects, including cumulative effects; consult with other agencies; allow public review; respond to comments on the draft environmental document; adopt CEQA findings; and provide for mitigation monitoring and reporting, as appropriate.

The CEQA Guidelines provide for the use of a "substitute document" by state agencies with certified programs (§ 15252). The document used as a substitute for an EIR (or negative declaration) is required to include at least the following:

> "(1) A description of the proposed activity, and
>
> "(2) Either:

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[4] California Code of Regulations, title 14, section 15000 et seq. (Unless otherwise noted, further references to the CEQA Guidelines refer to title 14 of the California Code of Regulations.)

[5] The 208 Planning Program is a comprehensive regional water quality management plan designed to remedy water pollution derived primarily from non-point sources. The 208 Planning Program is based on regulations set forth in Section 208 of the Clean Water Act.

> “(A) Alternatives to the activity and mitigation measures to avoid or reduce any significant or potentially significant effects that the project might have on the environment, or
>
> “(B) A statement that the agency’s review of the project showed that the project would not have any significant or potentially significant effects on the environment and therefore no alternatives or mitigation measures are proposed to avoid or reduce any significant effects on the environment. This statement shall be supported by a checklist or other documentation to show the possible effects that the agency examined in reaching this conclusion.”

Accordingly, the State Water Board has prepared this substitute environmental document in lieu of an EIR or other environmental document for the adoption of state policy for water quality control for the purposes of water right administration.

1.3.3 Scoping, Initial Study, and NOP

The State Water Board has solicited comments from interested persons and governmental agencies regarding the scope and content of the environmental information to be included in the substitute environmental document. On July 19, 2006, the State Water Board submitted a Notice of Preparation (NOP) of a Substitute Environmental Document and Notice of Public Scoping Meeting to the State Clearinghouse, Governor’s Office of Planning and Research. An Environmental Checklist, based on appendix G of the CEQA Guidelines, accompanied the NOP. The NOP was circulated to members of the public, government agencies, and other interested persons in order to solicit comments on the proposed Policy. The NOP and Initial Study are included in this substitute document as appendix A.

Notices of the scoping meeting were published in six newspapers of general circulation in the Policy Area. The scoping meeting was held in two sessions on August 16, 2006, in Santa Rosa, California. The purpose of the meeting was to explain the proposed Policy and provide related information to resource agency personnel and the interested public and to invite them to submit written comments concerning the range of actions, Policy alternatives, mitigation measures, and significant effects that should be analyzed in the substitute environmental document.

The scoping period ended on August 25, 2006. Thirty-two written comment letters were received during the scoping period, and four comment letters were received after the comment period closed. Comments were received from 10 state and local agencies and elected representatives, 14 non-governmental organizations and special-interest groups, and eight individuals. The scoping and public involvement process are described in a Scoping Report prepared for the proposed Policy. The Scoping Report summarizes the comments received during the scoping period and describes the process used to organize the comments.[6]

[6] The Scoping Report is posted on the State Water Board’s web site for the Draft Instream Flow Policy at http://www.waterrights.ca.gov/HTML/instreamflow_nccs.html. Also available on this web site are the Notice of Preparation (NOP), the Environmental Checklist, a PowerPoint presentation delivered at the scoping meeting, a map of the Policy Area, and comment letters received on the NOP.

2 PROPOSED POLICY

2.1 General Overview

The proposed activity addressed in this document is the State Water Board's adoption of the Policy for Maintaining Instream Flows in Northern California Coastal Streams, also known as the North Coast Instream Flow Policy. The proposed Instream Flow Policy does not establish specific instream flow requirements for particular rivers or streams, nor does it approve any particular water diversion projects. The Policy does not specify the terms and conditions that will be incorporated into water right permits, licenses, or registrations.

In general, the proposed Policy establishes a framework for how the State Water Board will make decisions in the context of water right administration that maintain instream flows to protect native fish populations, particularly anadromous salmonids and their habitat. The Policy will apply to applications to appropriate water, small domestic use and livestock stockpond registrations, and water right petitions.

The Policy identifies principles that will be applied in the administration of water rights (Policy, section 2.2). These principles are implemented through a set of "regionally protective criteria" (Policy, section 2.3), which are measures found to be protective of anadromous salmonid habitat throughout the Policy Area, while still allowing for water diversions. These measures, or criteria, would be applied to all applications for diversions in the Policy Area, unless site-specific studies are conducted. As discussed further below, these criteria address the season of diversion, minimum bypass flow, maximum cumulative diversion, onstream dams, and the cumulative effects of water diversions.

The proposed Policy limits construction of new onstream dams and contains measures to ensure that approval of new onstream dams does not adversely affect instream flows needed for fishery resources (Policy, section 4.4). Provisions of the Policy address requirements for fish screens on streams where fish and/or fish habitat are present and passive bypass systems (Policy, sections 4.3 and 7.0).

Because the State Water Board must find that water is available prior to issuing a water right permit, the proposed Policy includes provisions related to a "water availability analysis" (Policy, section 4.1 and appendix 1) for the Policy Area. Under the Policy, applicants would be required to submit information to be used in evaluating whether a proposed water diversion, in combination with other existing diversions in a watershed, may affect holders of senior water rights or affect instream flows needed for the protection of fishery resources. In this context, the Policy contains provisions for how to determine "the upper limit of anadromy"[7] and how to select "points of interest," which are locations on a stream channel where the applicant will analyze the effects of the proposed project in

[7] The term "anadromy" refers to a trait in certain types of fish where the adults migrate from the ocean to spawn in freshwater. The term "limit of anadromy" refers to the upstream limit of distribution in a watershed of adult anadromous fish or their offspring. The limit of anadromy is the point in a waterway where anadromous fish cannot go any further upstream due to either a barrier (dam), or because the watershed is too small to be used by the fish.

combination with other water diversions on fishery resources. Detailed guidelines and a flowchart for quantifying the unappropriated water remaining instream and implementing the instream flow-related criteria are appended to the Policy (Policy, Appendix 1).

To allow for conditions that are specific to a particular diversion or watershed, the proposed Policy includes an option for applicants to comply with the Policy by conducting site-specific studies that may lead to variances from the regional criteria (Policy, section 4.1.8). The Policy also allows for an alternative "watershed approach" that can be used by a group of diverters in a watershed to comply with the intent of the Policy (Policy, section 12.0). The Policy also includes provisions for compliance monitoring and reporting, as well as provisions intended to be applied to water right enforcement actions (Policy, section 11) within the Policy Area. How the proposed Policy was developed is briefly summarized in the Policy itself (section 2.1) and described in detail in a supporting technical document (R2 Resource Consultants 2007).

2.2 Geographic Policy Area

The geographic scope of the Policy Area includes all coastal streams from the mouth of the Mattole River south to San Francisco and coastal streams entering northern San Pablo Bay. The Policy Area includes approximately 5,900 stream miles and encompasses 3.1 million watershed acres (4,900 square miles), and is comprised of all of Sonoma and Marin counties and portions of Humboldt, Mendocino, and Napa counties. The Policy Area is shown in figure 1-1; the environmental setting of the Policy Area is generally characterized in section 4.0.

Major coastal salmon and steelhead stream basins from north to south include the Mattole, Ten Mile, Noyo, Big, Navarro, Garcia, Gualala, Russian, Walker, and Lagunitas drainages. Major salmon and steelhead stream basins draining to San Pablo Bay include Sonoma Creek and the Napa River drainages. There are also numerous smaller basins draining directly into the Pacific Ocean and San Pablo Bay that either currently support or historically supported anadromous salmonids. Project area streams represent a wide range of geologic, geomorphic, hydraulic, hydrologic, and biologic characteristics including channel size, channel slope, valley confinement, channel incision, topographic relief, soil type, hillslope and riparian vegetation, annual precipitation, and other features.

The Policy criteria for season of diversion, minimum bypass flow, maximum cumulative diversion, and the instream flow analysis requirements will not be applied to water diversions from the Russian River downstream of Lake Mendocino and Dry Creek downstream of Lake Sonoma. However, the proposed Policy principles (Policy, section 2.2), the regionally protective criteria pertaining to onstream dams, and all other aspects of the Policy will be applied to these stream reaches. For water diversions from these stream reaches, other methods will be used to evaluate water availability, consistent with the minimum instream flows for these stream reaches already established by the State Water Board (Decisions 1030 and 1610). These minimum flow requirements are implemented through terms in the permits held by the Sonoma County Water Agency. Diversions from streams contributing flows to these two stream reaches must comply with all aspects of the adopted Policy. The State Water Board may determine to commence a separate proceeding to review the instream flow requirements it has imposed on Sonoma County Water Agency. Any environmental impacts of revising these instream flow requirements will be evaluated in a separate project-level environmental document.

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North State Resources, Inc.

North Coast Instream Flow Policy Substitute Document

Figure 1-1
Policy Area Map

2.3 Policy Principles

As required by Water Code section 1259.4, the State Water Board must adopt a policy, for purposes of water right administration, which maintains instream flows in coastal streams in the Policy Area. The State Water Board's goals for this project are to:

1. protect instream flows through the administration of water rights in order to provide comprehensive, multi-species ecosystem protection for streams within the Policy Area.
2. stabilize and enhance fish and wildlife resources in the Policy Area;
3. minimize the impact of the new guidelines on water supply reliability throughout the Policy Area; and
4. provide meaningful regulatory stability by adopting criteria that meet all foreseeable State and federal requirements.

The proposed Policy is informed by certain principles:

- water diversions shall be seasonally limited to periods in which instream flows are naturally high to prevent adverse effects to fish and fish habitat;
- water shall be diverted only when stream flows are higher than the minimum instream flows needed for fish spawning and passage;
- the maximum rate at which water is diverted in a watershed shall not adversely affect the natural flow variability needed for maintaining adequate channel structure and habitat for fish;
- construction or permitting of new onstream dams shall be restricted. When allowed, onstream dams shall be constructed and permitted in a manner that does not adversely affect fish and their habitat; and
- the cumulative effects of water diversions on instream flows needed for the protection of fish and their habitat shall be considered and minimized.

2.4 Proposed Regionally Protective Criteria

2.4.1 Diversion Season

The season of diversion is the calendar period during which water may be diverted. As proposed in the Policy, the regional criterion for the season of diversion is the period from October 1 through March 31. This Policy element is intended to protect fishery resources, including fish habitat, by preventing water diversions when stream flows are low and water temperatures are high.

2.4.2 Minimum Bypass Flow

The minimum bypass flow is the minimum instantaneous flow rate of water at any location in a stream that is adequate for fish spawning and passage. In applying the minimum bypass flow to a diversion, it is the minimum instantaneous flow rate of water that must be moving past the point of diversion (POD) before water may be diverted under a permit. The regional criteria for the minimum bypass flow are provided in the proposed Policy (section 2.3.2) as two equations based on watershed drainage area, mean annual stream flow, and the extent of anadromous salmonids in the watershed.[8]

The minimum bypass flow criteria in the Policy are based on technical studies that found that impacts to fish spawning and passage may occur if stream flows are below minimum bypass flow levels. The Policy is intended to protect fishery resources, including fish habitat, by preventing water diversions during periods when streamflow is at or below the minimum bypass flow.

2.4.3 Maximum Cumulative Diversion

Adequate magnitude and variability in peak stream flows are needed to maintain stream channel geometry, vegetative structure and variability, gravel and wood movement, and other channel features and habitat needs of anadromous salmonids. As noted in the Policy (section 2.3.3), channel maintenance is a long-term process in which the basic habitat structure of a stream is formed and maintained by multiple, variable, high-flow events occurring on an annual basis.

Under the proposed Policy, the maximum cumulative diversion would be calculated based on a percentage of the 1.5-year instantaneous peak flow. The maximum cumulative diversion is the maximum rate at which water may be diverted by all diverters in a watershed.

The maximum cumulative diversion criteria in the proposed Policy are based on technical studies, which found that significant cumulative impacts to peak flows required for channel maintenance may occur when total combined maximum rates of diversion in a watershed exceed a maximum cumulative diversion threshold. In other words, high rates of diversion by multiple diverters in a watershed over time may result in cumulative, adverse effects on channel structure and other features and habitat needs of anadromous salmonids. The technical studies demonstrated that, for the maximum cumulative diversion, the use of a criterion of five percent of the annual maximum instantaneous peak stream flow that is equaled or exceeded, on average over the long term, once every one-and-one-half years would be protective of fishery resources, including fish habitat.

2.4.4 Onstream Dams

As defined in the proposed Policy (section 4.4), an onstream dam is a structure in a stream channel that impedes or blocks the passage of water, sediment, woody debris, or fish. The Policy applies a stream classification system[9] in setting permitting requirements for onstream dams, as follows:

- Class I: Fish always or seasonally present, either currently or historically, or habitat to sustain fish exists.
- Class II: Seasonal or year-round habitat exists for aquatic non-fish vertebrates and/or aquatic benthic macroinvertebrates.
- Class III: An intermittent or ephemeral watercourse having a defined channel with a defined bank (slope break) that shows evidence of periodic scour and sediment transport.

[8] The development and derivation of these equations is explained in a technical support document entitled North Coast Instream Flow Policy: Scientific Basis and Development of Alternatives Protecting Anadromous Salmonids – Task 3 Report (R2 Resource Consultants 2007).

[9] Stream classes are derived from California Department of Forestry and Fire Protection (CDF) stream classification system (Cal. Code Regs., title 14, § 916.5, table 1).

In addition to the stream class, the criteria related to onstream dams also apply according to whether the dam was built prior to or after July 19, 2006, the date when the CEQA NOP for the proposed Policy was issued. In summary, the onstream dam criteria are as follows.

Onstream Dams on Class I Streams

The State Water Board will not consider approving a water right permit for an onstream dam on a Class I stream unless all of the following requirements are met:

- The applicant provides documentation acceptable to the State Water Board that the onstream dam was built prior to July 19, 2006;
- Fish passage facilities are constructed in accordance with requirements provided by CDFG in a written certification, as specified in the Policy (section 4.4.1);
- Fish screens are installed in accordance with NMFS screening criteria;[10]
- A passive bypass system or automated computer-controlled bypass system is constructed that conforms with the requirements contained in the Policy (sections 4.4.1 and 7.0); and
- Mitigation plans for non-native species eradication, gravel and wood augmentation, and/or riparian habitat replacement are developed and implemented, where needed. Guidance for developing mitigation plans is provided in the Policy (section 4.4.4).

Onstream Dams on Class II Streams

Except for certain specified exceptions, the State Water Board will not consider approving a water right permit for an onstream dam on a Class II stream unless all of the following requirements are met:

- The applicant provides documentation acceptable to the State Water Board that the onstream dam was built prior to July 19, 2006;
- A passive bypass system or automated computer-controlled bypass system is constructed that conforms with the requirements contained in the Policy; and
- Mitigation plans for non-native species eradication, gravel and wood augmentation, and/or riparian habitat replacement are developed and implemented, where needed.

The State Water Board may consider approving water right permits for proposed onstream dams on Class II streams if all of the following conditions are met:

- The proposed dam is located above an existing permitted or licensed reservoir that provides municipal water supply or is under the jurisdiction of the Federal Energy Regulatory Commission;
- The existing permitted or licensed reservoir was constructed prior to the adoption of the Instream Flow Policy and does not have fish passage facilities and it is not feasible to construct fish passage facilities;
- The applicant prepares and submits a biological assessment demonstrating that there is no fish habitat present between the proposed dam and the existing reservoir; and

[10] See "Fish Screening Criteria for Anadromous Salmonids" on the NMFS website at http://swr.nmfs.noaa.gov/hcd/fishscrn.pdf

- Mitigation plans for non-native species eradication, gravel and wood augmentation, and/or riparian habitat replacement are developed and implemented, where needed.

Onstream Dams on Class III Streams

The State Water Board may consider approving a water right permit for an onstream dam on a Class III stream if all of the following requirements are met:

- A passive bypass system or automated computer-controlled bypass system is constructed that conforms with the requirements contained in the Policy; and
- Mitigation plans for non-native species eradication and gravel and wood augmentation are developed and implemented, where needed.

2.5 Alternative Means of Compliance

The proposed Policy sets restrictions on diversions in the Policy Area that are conservatively protective for anadromous salmonids and their habitat. In addition to the approach involving regionally protective elements, the Policy allows alternative means of compliance through (1) site-specific studies to justify a variance from the regional criteria and/or (2) implementation of a watershed approach to manage the use of water resources by multiple water diverters.

2.5.1 Site-Specific Study

The proposed Policy allows applicants to conduct site-specific studies to evaluate whether a variance from the regional criteria may be obtained for a specific, proposed water diversion project. Variances may be approved for diversion season, minimum bypass flow, and/or maximum cumulative diversion for a specific water diversion. The studies would need to be conducted by a qualified fisheries biologist, as defined in the Policy (Policy, section 4.1.5). Any variance would require approval by the State Water Board. If the proposed variance to the regional criteria is approved, then the site-specific criteria may be used to evaluate whether sufficient water is available for the proposed project while providing protective instream flows for fish and their habitat. The geographic scope of a site-specific study must extend to all points of interest. It must also contain the elements set forth in section 4.1.8 of the proposed Policy.

2.5.2 Watershed Approach

The Policy allows a group of several diverters in a single watershed to enter into a formal agreement to effectively manage the water resources of the watershed by maximizing the beneficial use of water while protecting the environment and public trust resources. This watershed approach enhances the standard water right permitting process by coordinating the development of multiple water right permits within the same watershed.

Under the Policy (section 12.0), the watershed group is required to provide the technical information necessary for the State Water Board to determine water availability, satisfy the requirements of CEQA, evaluate the potential impacts of water appropriation on public trust resources, make decisions on whether and how to approve pending water right applications for diverters in the watershed group, and make decisions on whether to approve proposed watershed management plans.

3 Regulatory Framework Affecting the Adoption and Implementation of the Policy

The State Water Board exercises adjudicatory and regulatory water quality and water right functions in California.[11] The principles and guidelines required by Water Code section 1259.4 must be adopted as part of state policy for water quality control pursuant to chapter 3, article 3 (commencing with section 13140) of the Porter-Cologne Water Quality Control Act (Porter-Cologne Act).[12] The Porter-Cologne Act provides the State Water Board with broad authority to adopt a policy that establishes principles and guidelines for the regulation of any activity, including water diversions, that may affect water quality. Protection of water quality requires the maintenance of instream flows to the extent necessary to protect the beneficial uses of the stream, including the instream beneficial uses.

3.1 Overview of Surface Water Rights and Administration

All water in California belongs to the people of the State.[13] Although water cannot be privately owned, the right to use water can be acquired pursuant to statutory and common law. California employs a dual system of surface water rights that recognizes both appropriative and riparian rights. An appropriative water right consists of the right to divert a specified quantity of water for a reasonable, beneficial use. Under the riparian doctrine, the owner of land contiguous to a watercourse has the right to the reasonable, beneficial use of the natural flow of water on his or her land. A riparian user may not seasonally store water or use water outside the watershed.

The State Water Board administers the statutory water right permit and license system, which applies to appropriations of water from surface streams and subterranean streams flowing through known and definite channels.[14] The Water Commission Act of 1913, which took effect on December 19, 1914, established the basis for this statutory appropriative process that is now codified in the Water Code. The permit and license system provides the exclusive means of acquiring a new appropriative water right.[15] Riparian rights and appropriative rights initiated before 1914 are excluded from the permit and license system,[16] but those water users generally must file statements of water diversion and use with the State Water Board.[17] An appropriative right carries a priority relative to other appropriative rights. The water user who is first in time, or "senior," is entitled to the full quantity of water specified under the right before junior appropriators may exercise their rights.

To obtain a new appropriative water right, a person must file a water right application with the State Water Board to appropriate water and use it for a reasonable and beneficial purpose.[18] In part, the

[11] Wat. Code, § 174.
[12] Wat. Code, § 13000 et seq.
[13] Wat. Code, § 102.
[14] Wat. Code, § 1200.
[15] Wat. Code, § 1225; *People v. Shirokow* (1980) 26 Cal.3d 301, 308-309 (162 Cal.Rptr. 30).
[16] Wat. Code, § 1201
[17] Wat. Code, § 5101. The section lists several exemptions from the filing requirement.
[18] Wat. Code, §§ 100, 275, 1252.

water right application must identify the nature and amount of the proposed use, the proposed place of diversion, the type of the diversion works, the proposed place of use, and sufficient information to demonstrate a reasonable likelihood that the unappropriated water is available for the proposed appropriation.[19] In acting on an application, the State Water Board must consider the relative benefit to be derived from all beneficial uses of water concerned, including the preservation and enhancement of fish and wildlife, and uses protected in a relevant water quality control plan.[20] The State Water Board may impose terms and conditions that will best develop, conserve, and utilize in the public interest the water sought to be appropriated, protect fish and wildlife, and carry out water quality control plans.[21] The State Water Board must also consider the public trust (discussed below).

The water right process is a three-stage process: (1) file an application and receive a permit, (2) diligently develop a water supply project consistent with the conditions of the permit and put water to beneficial use, and (3) receive from the State Water Board a license confirming the extent to which beneficial use of water was made. In issuing permits and licenses, or approving changes to those rights, the State Water Board may include terms and conditions to protect existing water rights, the public interest, and the public trust, and to ensure that water is put to beneficial use.

3.2 Overview of Groundwater Rights

Pursuant to Water Code 1200, the State Water Board has permitting authority over subterranean streams flowing in known and definite channels. Groundwater classified as percolating groundwater is not subject to the State Water Board's permitting authority. Thus, when considering an appropriation of groundwater, the State Water Board may have to evaluate the legal classification of the groundwater and determine whether it is a subterranean stream subject to the State Water Board's permitting authority.

In determining the legal classification of groundwater, the following physical conditions must exist for the State Water Board to classify groundwater as a subterranean stream flowing through a known and definite channel:

1. A subsurface channel must be present;
2. The channel must have relatively impermeable bed and banks;
3. The course of the channel must be known or capable of being determined by reasonable inference; and
4. Groundwater must be flowing in the channel.[22]

If these four conditions are met, then the diversion of water is from a subterranean stream subject to the State Water Board's permitting authority.

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[19] Wat. Code, § 1260.
[20] Wat. Code, § 1257
[21] Wat. Code, §§ 1253, 1257, 1257.5, 1258.
[22] Decision 1639; Order WRO 2003-0004; *North Gualala Water Co. v. State Water Resources Control Bd.* (2006) 139 Cal.App.4th 1577, 1606 (43 Cal.Rptr.3d 821) (upholding four-part test as consistent with the language and intent of Water Code section 1200).

3.3 Other State Water Board Authority

The California Constitution (article X, section 2) and Water Code section 100 prohibit the waste, unreasonable use, unreasonable method of use, and unreasonable method of diversion of water. The constitutional doctrine of reasonable use applies to all water users, regardless of the basis of the water right, which serves as a limitation on every water right and every method of diversion.[23] Water Code section 275 directs the State Water Board to take all appropriate proceedings or actions to prevent waste or violations of the reasonable use standard. Thus, the State Water Board has jurisdiction to regulate water use in accordance with article X, section 2 of the Constitution.[24]

The California Constitution also declares that the general welfare requires that the State's water resources be put to beneficial use to the fullest extent to which they are capable.[25] Therefore, in determining the reasonableness of a particular use of water or method of diversion, other competing water demands and beneficial uses of water must be considered. A particular water use or method of diversion may be determined to be unreasonable based on its impact on fish, wildlife, or other instream beneficial uses.[26] What constitutes a reasonable water use depends on the entire circumstances presented and varies as current conditions change.[27]

The State Water Board also has "an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect the public trust uses whenever feasible."[28] The purpose of the public trust doctrine is to protect navigation, fishing, recreation, environmental values, and fish and wildlife habitat. Under the public trust doctrine, the state is the administrator of the public trust for the people of California. The State retains supervisory control over the navigable waters of the state and the lands underlying those waters.[29] The State's public trust responsibilities also extend to protecting navigable waters from harm caused by a diversion of nonnavigable tributaries. Before the State Water Board approves an appropriative water right diversion, it must consider the effect of such diversions on public trust resources and avoid or minimize any harm to those resources where feasible. In applying the public trust doctrine, the State Water Board has the power to reconsider past water allocations even if the Board considered public trust impacts in its original water allocation decision.

Thus, the State Water Board may exercise its authority under the doctrines of reasonable use and the public trust to address diversions of surface water or groundwater that reduce instream flows in the Policy Area and thus adversely affect fish, wildlife, or other instream beneficial uses.

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[23] *Peabody v. Vallejo* (1935) 2 Cal.2d 351, 367, 372 (40 P.2d 486).
[24] See *Imperial Irrigation Dist. v. State Water Resources Control Bd.* (1986) 186 Cal.App.3d 1160 (231 Cal.Rptr. 283) (extending jurisdiction to pre-1914 rights).
[25] Cal. Const., art. X, § 2.
[26] *Environmental Defense Fund, Inc. v. East Bay Mun Utility Dist.* (1980) 26 Cal.3d 183 (161 Cal.Rptr. 466)
[27] *Id*. at p. 194.
[28] *National Audubon Society v. Superior Ct.* (1983) 33 Cal.3d 419, 434-435 (189 Cal.Rptr. 346.)
[29] *Id*. at p. 445.

3.4 Water Quality Administration

3.4.1 Porter-Cologne Water Quality Control Act

California's primary authority for regulating surface and groundwater quality is the Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.). Under the Porter-Cologne Act, the state is divided into nine regions. Within each region, a California Regional Water Quality Control Board has primary responsibility for protecting water quality. The State Water Resources Control Board oversees the regional water boards' implementation of the Porter-Cologne Act. As part of the Porter-Cologne Act, the regional water boards establish water quality control plans. The nine regional water quality control plans must identify beneficial uses for the waters within the region, water quality objectives which protect the beneficial uses, and a program of implementation to implement the water quality objectives. The water quality control plans serve as foundational documents for most of the regional water boards' other activities, such as investigating the quality of a region's waters, permitting activities that discharge waste, and enforcement actions.

Streams affected by the proposed Policy are subject to water quality regulation by one of two regional water boards. The North Coast Regional Water Quality Control Board (North Coast Regional Water Board) is responsible for adopting and implementing the Water Quality Control Plan for the North Coast Basin (North Coast Basin Plan). The North Coast Basin Plan includes all the land area that drains into the Klamath River and North Coast basins. The San Francisco Bay Regional Water Quality Control Board (San Francisco Bay Regional Water Board) is responsible for adopting and implementing the Water Quality Control Plan for the San Francisco Bay Basin (San Francisco Bay Basin Plan). The San Francisco Bay Basin Plan includes all of the San Francisco Bay segments extending to the mouth of the Sacramento-San Joaquin Delta.

Stream and Wetlands System Protection Policy

Both the North Coast Regional Water Board and the San Francisco Bay Regional Water Board have proposed to develop amendments to their Basin Plans that will protect stream and wetland systems, and include measures to protect riparian areas and floodplains. The proposed Stream and Wetlands System Protection Policy will recognize that it is necessary to protect and restore the physical characteristics of stream and wetlands systems, including their connectivity and natural hydrologic regimes, to achieve water quality standards and protect beneficial uses set forth in the Basin Plans.

4 EXISTING ENVIRONMENTAL SETTING

This section provides general descriptions of selected resource areas as a context for other discussions in the document. As previously shown in figure 1, the Policy Area covers an extensive area from southern Humboldt County to San Francisco Bay and to watersheds draining into northeastern San Pablo Bay. As noted, the Policy Area comprises approximately 5,900 stream miles and encompasses approximately 3.1 million watershed acres (4,900 square miles) in Humboldt, Mendocino, Sonoma, Marin, and Napa counties. The descriptions are not intended to be a comprehensive characterization of the entire Policy Area.

4.1 Geologic Setting

The Policy Area is located in the Coast Ranges Geomorphic Province. The area is generally hilly and mountainous, except for about 550 square miles of relatively flat area (slopes less than 4 percent), 45 percent of which lies in the Russian River basin and the remainder in the lower part of basins draining into San Pablo Bay. Elevations generally vary from sea level to 4,000 feet above mean sea level (msl), occasionally reaching 6,000 feet.

The Coast Ranges are composed of thick Mesozoic and Cenozoic sedimentary strata. The coastline of the Pacific Ocean is generally uplifted, terraced, and wave-cut. The southern end of the northern Coast Ranges is marked by a depression containing San Francisco Bay. The northern Coast Ranges are dominated by the irregular, knobby, landslide-prone topography of the Franciscan Complex. The eastern portion of the range is characterized by strike-ridges and valleys in Upper Mesozoic strata. In several areas, Franciscan rocks are overlain by volcanic cones and flows of the Quien Sabe, Sonoma, and Clear Lake volcanic fields. The Franciscan rocks and, to a lesser degree, the younger volcanics, have been folded, faulted, and eroded to form northwest-trending ridges and valleys, which are nearly parallel to the active San Andreas Fault, a major fault zone extending from Point Arena to the Gulf of California (California Geological Survey 2002).

Some valleys in the Policy Area are broad and flat and contain thick sedimentary deposits (U.S. Geological Survey 1967). Some gradient valleys contain thick deposits of gravel derived from the erosion of surrounding mountains, and others are steep and narrow, actively eroding, and contain relatively little alluvial gravel. Many channels are incised in response to tectonic and erosion processes, land use practices resulting in the loss of a stabilizing riparian zone, and increased peak flows in urbanized settings (Haltiner et al. 1996, cited in R2 Resource Consultants 2007). Valleys generally follow zones of brecciated rock along folding and fault lines, where hummocky topography and landslides are prominent features of the landscape (Rantz and Thompson 1967, Kondolf et al. 2001, cited in R2 Resource Consultants 2007).

4.2 Hydrology and Water Quality

Streams in the Policy Area have distinct seasonal runoff patterns, reflecting low amounts of precipitation from June through September. The climate is characterized as Mediterranean, with mild wet winters and cool dry summers along the coast; summer temperatures are considerably warmer in the inland valleys than in the coastal basins. Rantz and Thompson (1967) estimated that about 80 percent of the total precipitation in the Policy Area falls during five months, from November through March (R2 Resource Consultants 2007).

The relatively low elevations of the mountains in the Policy Area produce little snowmelt runoff. Mean annual precipitation increases from south to north along the coast, and from inland to the coast for basins draining into San Pablo Bay, ranging from approximately 20 inches in the Napa Valley to approximately 110 inches on the mountain divide of the Mattole River basin. Mean annual precipitation is strongly influenced by altitude and the steepness of the coastal mountain slopes. About 80 percent of the total annual runoff occurs during the four months of December through March. Rains during November generally contribute little runoff and are instead absorbed by the ground. The bulk of precipitation typically falls during several storms each year. There is a small lag between rainfall and runoff once ground conditions become more saturated in November, reflecting low soil and surface rock permeability and a limited capacity for subsurface storage (Rantz and Thompson 1967, cited in R2 Resource Consultants 2007). This relationship between rainfall and ground conditions results in streams with relatively "flashy" storm runoff hydrographs.

Compared with flows during winter, stream flows during summer and early fall are generally low, and many small streams in the Policy Area may go dry. Because of the low infiltration capacity and permeability of the Franciscan and volcanic rocks, summer baseflows in streams are poorly maintained. Along the mountain drainages, baseflow that does occur is maintained by groundwater discharge emerging from fractures through springs and seeps. As a result, some streams may be composed of discontinuous wet reaches with pools sustained over the summer by groundwater discharge. Some higher elevation streams may run dry from summer to late fall. Some streams flow throughout the dry season during wet years, maintain isolated pools in average years, and have no water in them in dry years (Opperman 2002, cited in R2 Resource Consultants 2007). In the valleys, groundwater occurs in the alluvial deposits. There, summer baseflow is maintained by groundwater discharge along reaches where the water table is higher than the adjacent stream. In the larger valley drainages, such as the Napa River, Sonoma Creek, Petaluma River, Russian River, and Lagunitas Creek (figure 4-1), groundwater discharge is large enough to sustain perennial flow.

As a result of the low water yield of the Franciscan and volcanic rocks, groundwater development in the mountainous areas is limited. Well yields are low, typically on the order of a few gallons per minute; however, in some locations, the yields are sufficient for domestic, stock pond, or small-scale irrigation purposes. The vast majority of groundwater development occurs in the larger valley drainages, particularly the Napa and Russian rivers, where urban water purveyors operate extensive wellfields. Some wells in these areas yield as much as 3,000 gallons per minute (California Department of Water Resources 1975, cited in R2 Resource Consultants 2007). Figure 4-2 shows the groundwater basins in the Policy Area.

The demand for water for out-of-channel uses is lower for some streams in some regions of the Policy Area than in others. Most coastal rivers and streams north of the Russian River have been affected more by timber harvest activities than by water diversions. In the Policy Area in general, there is a gradual shift in a southerly direction from impacts resulting from timber harvesting toward impacts resulting from water diversions and grazing. The Navarro River and, to a lesser extent, the Garcia

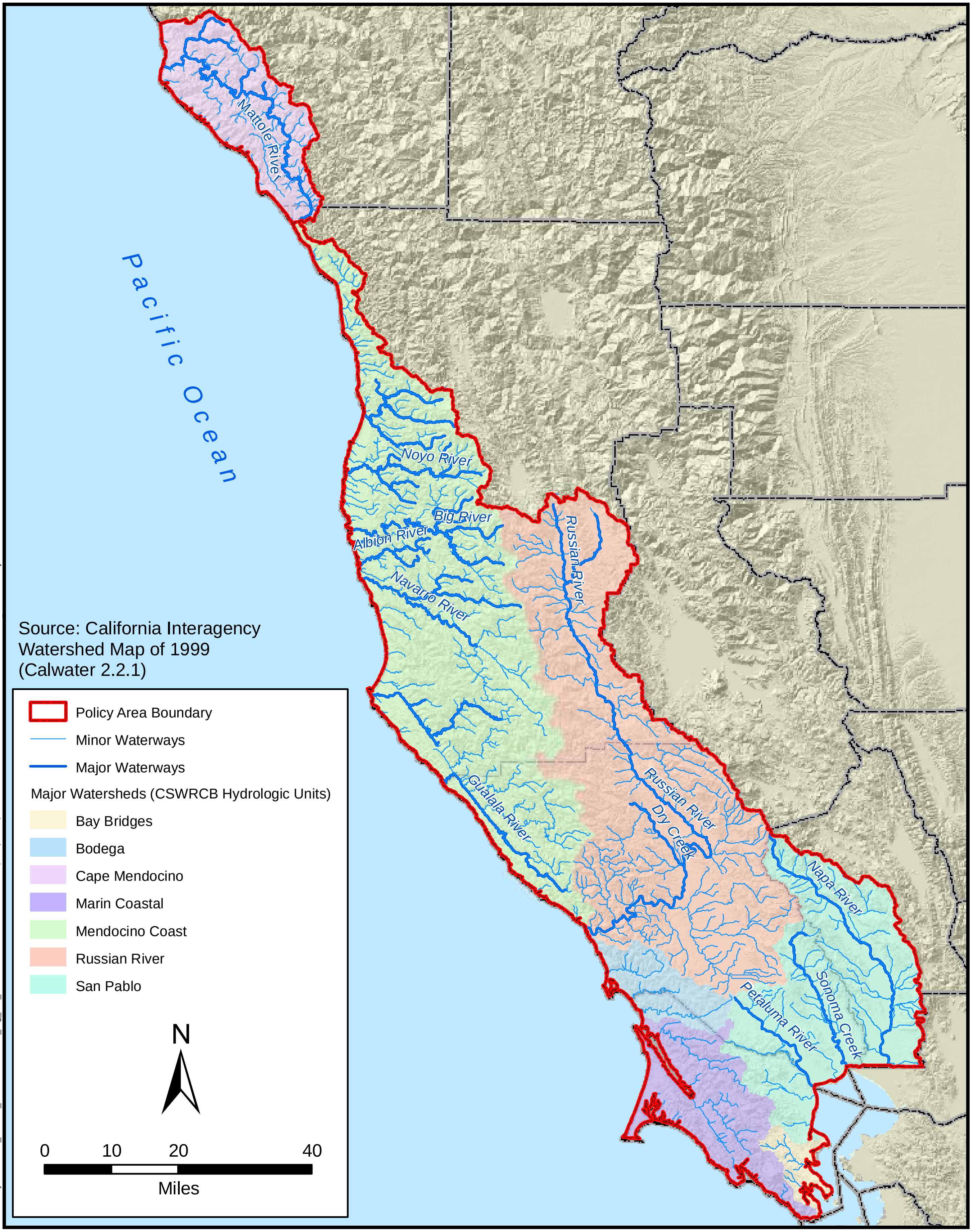

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Figure 4-1
Major Rivers and Watershed Areas

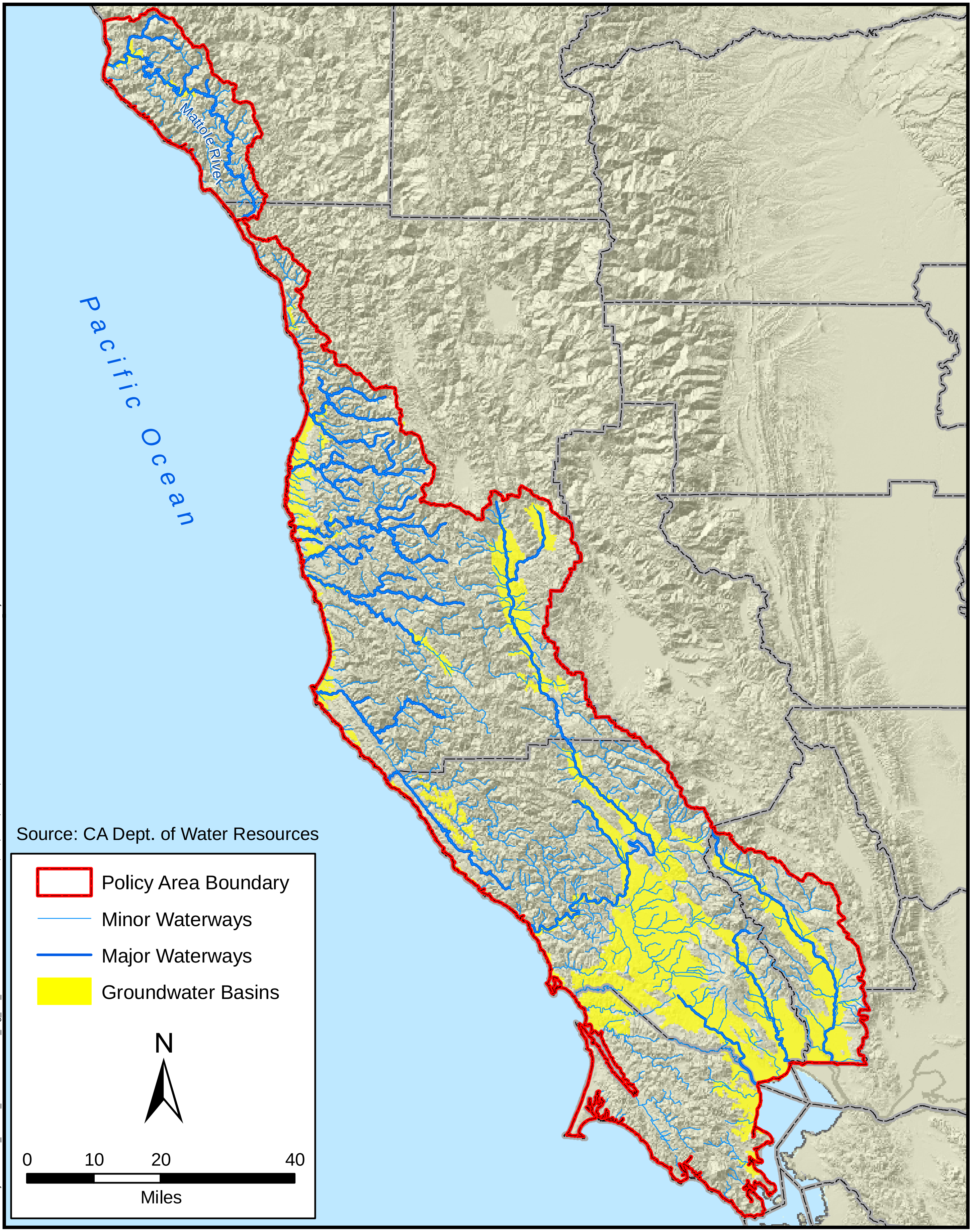

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Figure 4-2
Groundwater Basins

River represent transition basins in that they have experienced varying levels of timber harvesting, water use, and grazing impacts.

The Policy would be applicable to a wide range of stream sizes. Following the stream-ordering system of Strahler (1957),[30] most streams in the Policy Area are of third-order or smaller. There are approximately 2,594 first-order, 616 second-order, 161 third-order, and 31 fourth-order streams in the Policy Area. Most first-order streams have a drainage area of less than 3 square miles, and most second-order streams have a drainage area of less than 10 square miles (R2 Resource Consultants 2007).

4.2.1 Water Quality

The Policy Area includes portions of the regions administered by the North Coast Regional Water Quality Control Board and the San Francisco Bay Regional Water Quality Control Board. In the discussion below, impaired waters are those that do not meet Clean Water Act (CWA) water quality standards under section 303(d). Under the CWA, states must identify these waters and determine a total maximum daily load (TMDL). A TMDL sets the maximum amount of pollution a water body can receive without violating water quality standards.

The North Coast Region

The North Coast Regional Water Board covers approximately 10 percent of the State; however, the region yields about 40 percent of the surface water in California. The region is characterized by numerous rivers and streams of the highest quality, with vast areas of wilderness and managed forests. Most significant point source discharges are well regulated and significant progress has been made with non-point sources. In addition to monitoring point sources and working with resource users to enhance beneficial uses, the primary focus is pollution prevention. While only a small fraction of the waters have been assessed, these were generally found to be of good or intermediate quality.

In the North Coast Region only a small portion of the total assessed river and stream miles are impaired due to water quality issues (about 84 miles). Due to the large number of smaller tributary streams, a large percentage of the total river and stream miles have not been assessed (State Water Board 2007).

The primary reason for listing of surface waters in the North Coast region as impaired is excessive sedimentation (The North Coast Regional Partnership and Del Norte, Humboldt, Mendocino, Modoc, Siskiyou, Sonoma and Trinity Counties 2005). Identified sediment sources include erosion from logged lands, agriculture, construction sites, and runoff and sediment transport from urban and residential areas. Sediments result in a reduction in water quality and can also affect beneficial uses

[30] Under Strahler's stream-ordering system, a small stream high in the watershed and at the greatest distance upstream in a drainage network is a first-order stream. Second-order streams extend downstream from the confluence of two first-order streams; third-order streams extend downstream from the confluence of two second-order streams; and so on. The stream ordering described here was based on streams designated in the 1:100, NHD Plus geospatial data sets from Horizon Systems Corporation developed for the Environmental Protection Agency using the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) as base data (Horizon Systems 2006).

of those waters including uses associated with the migration, spawning, reproduction, and early development of coldwater anadromous fishes such as coho salmon and Chinook salmon. According to the 2006 Clean Water Act section 303(d) list, approximately 61 percent of the assessed water bodies within the North Coast Region drain to rivers and streams that are impaired by too much sediment.

Although sediment is the most commonly exceeded TMDL in the North Coast Region, there are many other TMDLs within the region. Some examples of other TMDLs monitored by the State include temperature, exotic species, nutrients, mercury, dioxins, PCBs (polychlorinated biphenyls), organic enrichment/low dissolved oxygen, pH, and turbidity. Sources of TMDLs can vary greatly but may include storm water runoff; erosion and sedimentation from roads, agriculture, and timber harvest; channel modification activities; gravel mining and dairy operations; failing septic tanks; and MTBE, PCE, and dioxin contamination from gas stations and industrial activities (North Coast Regional Water Quality Control Board 2005).

The San Francisco Bay Region

The region administered by the San Francisco Bay Regional Water Board is one of the largest urbanized estuaries in the country, with a population of about six to seven million people. The region also contains substantial agricultural areas, including the Napa/Sonoma wine region. The rivers and streams of the San Francisco Bay Region feed the San Francisco Bay Estuary and Tomales Bay.

More than half of the river miles within the region are considered of good quality or are unassessed; however, water quality of many impaired water bodies continues to be degraded from pollutant discharge. About one quarter of the assessed river and stream miles in the region are considered impaired. The primary types of water quality problems facing the region range from those that are typically considered rural (agriculture and mining) to those considered urban (stormwater drainage systems, municipal, and land development). Pollutants come from diffuse, non-point sources and from the cumulative impacts of multiple point sources such as discharges from urban areas.

The northern part of the region supports primarily agricultural uses, with numerous wineries and dairies. TMDLs in the region include oxygen-depleting organic matter, nitrogen compounds, herbicides, and pesticides. Urban and industrial TMDLs may include chemicals like diazinon, selenium, ammonia, and dioxin compounds; heavy metals such as mercury; trash; and pH (State Water Resources Control Board 2007).

4.3 Plant Communities

To generally characterize the plant communities within the large scale of the area covered by the Policy, a hierarchical framework of ecological units can be used. The Policy Area can be described as part of two large “sections” in two larger “provinces”: the Northern California Coast section of the California Coastal Steppe, Mixed Forest, and Redwood Forest Province, and the Northern California Coast Ranges section of the Sierra Steppe-Mixed Forest-Coniferous Forest Province (USDA Forest Service 1997, Sawyer and Keeler-Wolf 1995). These ecological areas are shown in figure 4-3.

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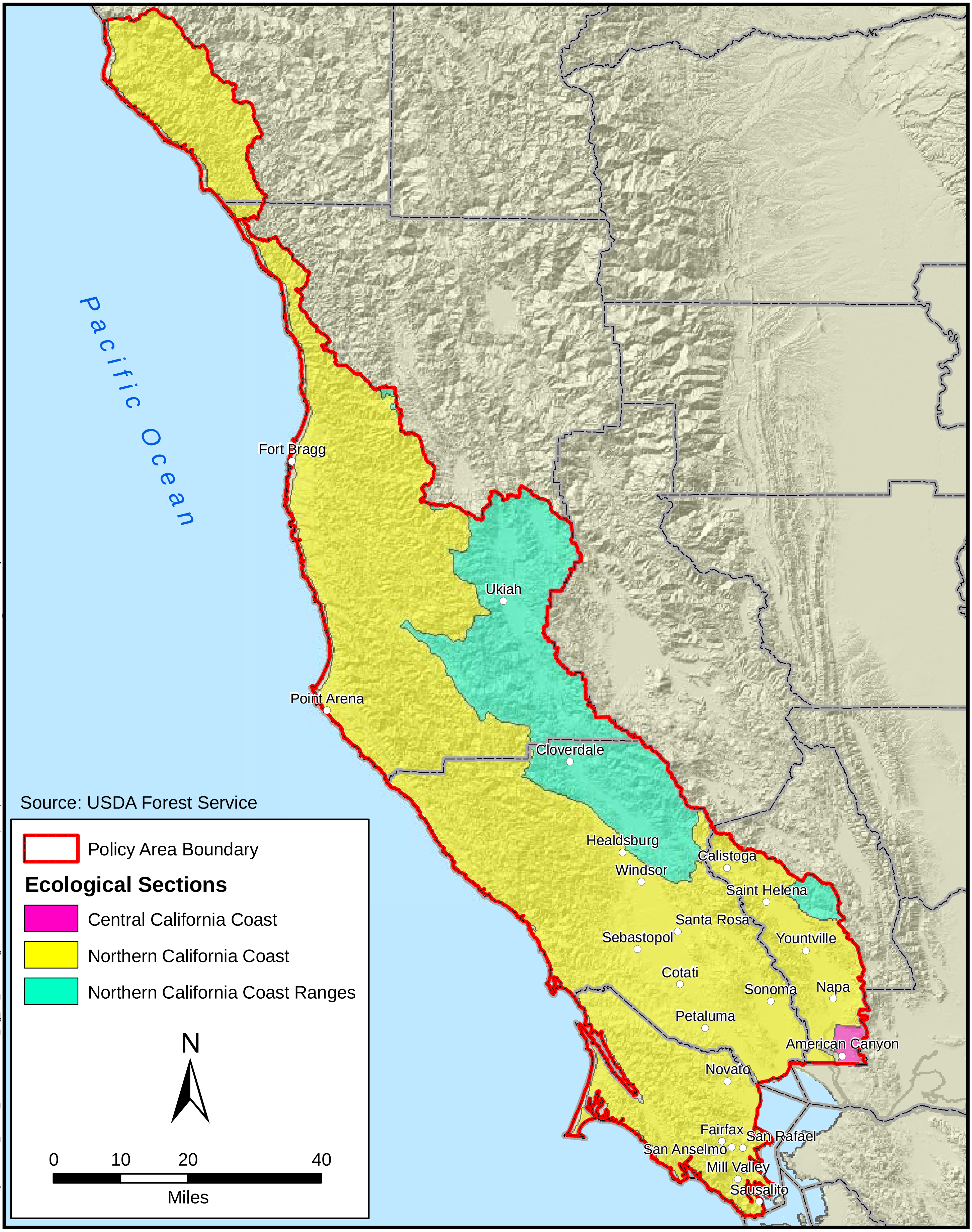


Figure 4-3
Ecological Subregions of the Policy Area

4.3.1 Coastal Steppe, Mixed Forest, and Redwood Forest Province

The Northern California Coast Section of the Coastal Steppe, Mixed Forest, and Redwood Forest Province covers the majority of the Policy Area, including all of the western region from the mouth of the Mattole River in Humboldt County south to Marin County, as well as the area immediately north of San Pablo Bay. This section is further divided into several subsections. The largest of these subsections, the Coastal Franciscan subsection, extends from southern Humboldt County south through Mendocino County into Sonoma County. The predominant natural plant communities of the Coastal Franciscan subsection include redwood series, Douglas-fir–tanoak series, and needlegrass grasslands in the north and Douglas-fir–tanoak series in the central and southern interior parts of this subsection. Canyon live oak series is common on very steep slopes. Sergeant cypress series is found on serpetinitic soils. Black cottonwood series is common in riparian areas. Characteristic plant series by lifeform in this subsection include grassland, shrublands, forests, and woodlands.

Other smaller subsection areas exhibit different combinations of plant communities. In the vicinity of Fort Bragg, the predominant natural plant community of the dissected, elevated coastal plain (in the Fort Bragg Terraces Subsection) is redwood series, with grand fir and western hemlock series, Bishop pine and pygmy cypress series, and red alder series. Characteristic plant series by lifeform in this subsection include dune vegetation, grasslands, forests, and woodlands.

In the vicinity of Point Arena to Fort Ross, a narrow strip of coastal plain is recognized as the Point Arena Subsection. The predominant natural plant community in this area is the redwood series, with minor occurrences of Bishop pine and pygmy cypress series. Dune lupine–goldenbush series is common on coastal bluffs. Characteristic plant series by lifeform in this subsection include dune vegetation, grasslands, shrublands, forests, and woodlands.

The broad northwest-trending valley of the Santa Rosa Plain and the rolling hills between that plain and the ocean (including Bodega Head) are recognized as the Santa Rosa Plain Subsection. The predominant natural plant communities in this area are needlegrass grasslands and valley oak series in inland valleys. Northern claypan vernal pools occur on the Santa Rosa Plain, and Pacific reedgrass and needlegrass series occur on the rolling hills between the plain and the coast. Coast live oak is common on leeward slopes. Characteristic plant series by lifeform in this subsection include dune vegetation, saltmarsh, grasslands, vernal pools, shrublands, forests, and woodlands.

The Point Reyes Peninsula (Point Reyes Subsection) is bounded by the San Andreas Fault on the northeast and by the Pacific Ocean on all other sides. The predominant natural plant communities of the granitic terrain are mainly Douglas-fir–tanoak series, Bishop pine series, and coast live oak series. In the sedimentary rock terrain the plant communities are mainly Pacific reedgrass series and coyote brush series. The dunes support a succession of plant communities. Characteristic plant series by lifeform in this subsection include dune vegetation, saltmarsh, grasslands, shrublands, forests, and woodlands.

The Marin Hills and Valleys Subsection comprises the mountains and hills of Marin County north of the Golden Gate, east of the San Andreas Fault, and west of San Pablo Bay. Depending on soil and moisture regimes, predominant plant communities include redwood series, Douglas-fir–tanoak series, and coast live oak series. Grasslands are predominantly California oatgrass or Pacific reedgrass series in the southwest, and needlegrass grassland in the remainder. Chamise is present on shallow soils.

Characteristic plant series by lifeform in this subsection include grasslands, shrublands, forests, and woodlands.

The area north of San Pablo Bay is the San Pablo Flats Subsection, which is generally less than 10 feet above mean sea level. The predominant natural plant community is the pickleweed series. Saltgrass series is prevalent around the inland margins of salt marsh; sedge meadow communities and emergent aquatic communities are prevalent away from the bay. Characteristic plant series by lifeform in this subsection include grasslands, saltmarsh, and freshwater marshes.

The Mount St. Helena Flows and Valleys Subsection comprises three northwest-trending ranges dominated by Sonoma volcanics, and the valleys of the Napa River and Sonoma Creek that flow through the valleys between those ranges. The natural plant communities are mainly coast live oak series and, to a lesser extent, Oregon white oak at lower elevations and on south-facing slopes; Douglas-fir series in moist canyons and on north-facing slopes; and chamise series on shallow soils. A small area of redwood series, valley oak series, and needlegrass grasslands also occurs. Characteristic plant series by lifeform in this subsection include grasslands, forests, and woodlands.

4.3.2 Sierra Steppe-Mixed Forest-Coniferous Forest Province

In the other ecological region, or province—the Sierra Steppe-Mixed Forest-Coniferous Forest Province—one section is represented in the Policy Area: the Northern California Coast Ranges section. This section is the interior part of the northern California Coast Ranges mountains. This section includes portions of Mendocino, Sonoma, and Lake Counties within one subsection, the Central Franciscan Subsection. The predominant natural communities in the Central Franciscan Subsection are the Douglas-fir–tanoak series with needlegrass grasslands and Oregon white oak in the northern part; and a mosaic of mixed conifer series, needlegrass grasslands, blue oak series, and chamise series in the southern part. Characteristic plant series by lifeform in this subsection include grasslands, shrublands, forests, and woodlands.

4.4 Riparian Communities

Riparian communities provide a crucial link between terrestrial and aquatic ecosystems, forming a unique and distinct unit within the surrounding landscape. The riparian zone can be considered essentially as the terrestrial component of the stream environment. Riparian zones are typically subject to partial or complete flooding, and riparian vegetation is adapted to the particular climatic and topographic attributes of the zone. Riparian habitat includes trees, other vegetation, and physical features normally found on the banks and floodplains of rivers, streams, and other bodies of fresh water.

Close relationships exist among the riparian zone, the fluvial processes of the channel, and fish habitat. Native vegetation in riparian zones offers habitat for terrestrial wildlife by supplying food and shelter. Additionally, riparian vegetation provides detritus or vegetable matter, which breaks down and provides food for aquatic invertebrates. Fallen branches, large woody debris, and aquatic plants provide habitat for instream fauna such as native fish and crustaceans (Fowley and Ridgway, 2000).

Intact, mature riparian forests tend to be a dense tangle of large trees in the over-story, and smaller trees, vines, downed wood, and various herbs and fungi in the under-story. The diversity of plants and complexity of habitats in these mature riparian forest zones support an incredible number of animal species (Circuit Rider Productions, Inc., 2003). Riparian areas support the salmonid life cycle and an abundance of other wildlife species (Circuit Rider Productions, Inc., 2003). Over 225 species of birds, mammals, reptiles, and amphibians depend upon California's riparian habitats (Knopf et al. 1988, Saab et al. 1995, Dobkin et al. 1998, Clemons 2003, cited in R2 Resource Consultants 2007). The northern coastal streams in California support up to 15 percent of the pre-1840 riparian vegetation (Katibah 1984, Clemons 2003, cited in R2 Resource Consultants 2007).

Riparian habitat is important for fish and other aquatic and terrestrial species throughout the Policy Area. Beach (1996, cited in R2 Resource Consultants 2007;) noted that about 50 percent of reptiles and 75 percent of amphibians in California are dependent on riparian habitat. The riparian zone serves numerous physical and ecological functions for fish in project area streams including providing instream habitat structure, bank stability and erosion prevention (lateral and vertical), bank cover, shade and temperature control, organic nutrient material, insects for fish food, and other functions.

Riparian zones in the Policy Area serve a variety of functions important for creating and maintaining anadromous salmonid habitat. They provide habitat structure and cover by contributing large woody debris and helping to maintain bank stability, water temperature control through shading, input of organic material for secondary production, and a food source for juveniles from falling insects. Large woody debris is more important for habitat structure in streams with conifer-dominated riparian zones, and less prevalent in hardwood dominated streams, primarily because of size differences between hardwood and conifer pieces.

Riparian communities in the eastern and northern portions of the Policy Area have been described as one of three broad types: headwaters areas, mid-level areas, and broad valley floodplains (Roberts 1984, cited in R2 Resource Consultants 2007). In headwaters areas, stream channels are often actively eroding close to or at bedrock. Riparian vegetation composition and density reflect the ability of plants to find a foothold and nourishment in thin alluvial soils covering the bedrock. Unimpacted stream flow regimes in most cases provide adequate year-round water for riparian vegetation. In mid-level areas, most streams contain gravel bars and sand flats that support riparian vegetation, often in narrow strips between the stream and bedrock hillslopes. The vegetation is relatively susceptible to scouring during floods, with recolonization depending on seed source proximity to the channel and dispersal mechanisms. Riparian groves are found in wider valleys with terraces. In the third community type, broad-valley floodplain areas, deposition of a thick sediment layer near abundant water is associated with riparian gallery forests. Colonization processes occur rapidly, although this community is influenced heavily by land use practices including clearing and grading (Roberts 1984, cited in R2 Resource Consultants 2007).

Riparian communities in the coastal basins north of the Russian River tend to include an overstory consisting of mixed conifer and hardwood big leaf species, with various willows, vines, epiphytes, herbaceous vegetation, and other woody plants forming an understory. Willows are typical "pioneers" in disturbed areas. In redwood forests, the redwoods form the primary overstory species, with other tree species forming part of the understory. Most riparian systems in the region have been altered by timber harvesting or fire. Many systems have evolved through succession to relatively diverse second-growth forests (Ray et al. 1984, cited in R2 Resource Consultants 2007).

Floodplain riparian forests are among the most important, and most impacted, habitats in California. The area and diversity of the riparian zone in the Russian River watershed have been reduced considerably from historic levels by a variety of land uses. Many of the areas that historically supported floodplain wetlands and riparian forests in a mature stage have been converted to agricultural lands. The construction of large dams on the East Fork of the Russian River and Dry Creek has influenced characteristic flow and sediment transport regimes, which in turn have likely influenced the extent and characteristics of the riparian zone as well. Most of the riparian community in the basin is dominated by hardwood species such as California bay laurel, white alder, and various oak and willow species. However, several invasive species, particularly giant reed *(Arundo donax)*, are changing the riparian zone community structure at isolated locations in the basin (Florsheim et al. 1997, Opperman 2002, Opperman and Merenlender 2003, cited in R2 Resource Consultants 2007).

4.5 Wetlands

Wetlands are areas that are regularly saturated by surface water or groundwater for all or part of the year including the growing season. They are transitional areas between terrestrial and aquatic ecosystems, and are characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. Wetlands are highly productive and complex ecosystems that provide a number of functions of value to the human and natural environment in terms of water quality, hydrologic functions, and habitat. Wetland functions include groundwater recharge; floodflow storage, dampening, and modification; shoreline and bank stabilization; sediment and toxicant retention; nutrient removal or transformation; production export (organic matter formed in a wetland transported downstream and used by other organisms); aquatic diversity and abundance; and terrestrial diversity and abundance. These functions in turn contribute to many human benefits and values, including flood control, food production, fishing and hunting, recreation, and aesthetics (Schneider and Sprecher 2000; EPA 2007). All of these functions, benefits, and values are associated with wetlands in the Policy Area.

A number of classification systems have been developed for describing wetlands. One well recognized system is the classification system used by the National Wildlife Inventory (NWI), which is based on the classification system of Cowardin and others (1979). The NWI system defines types of wetlands by systems, subsystems, and classes (further refined in terms of subclasses and modifiers). A wide range of wetland types occurs in the Policy Area, within all the main NWI wetland systems: marine (intertidal), estuarine (pertaining to estuaries), lacustrine (pertaining to lakes), riverine, (pertaining to rivers), and palustrine (which includes all wetlands not assignable to any of the four other systems).

4.6 Anadromous Fish

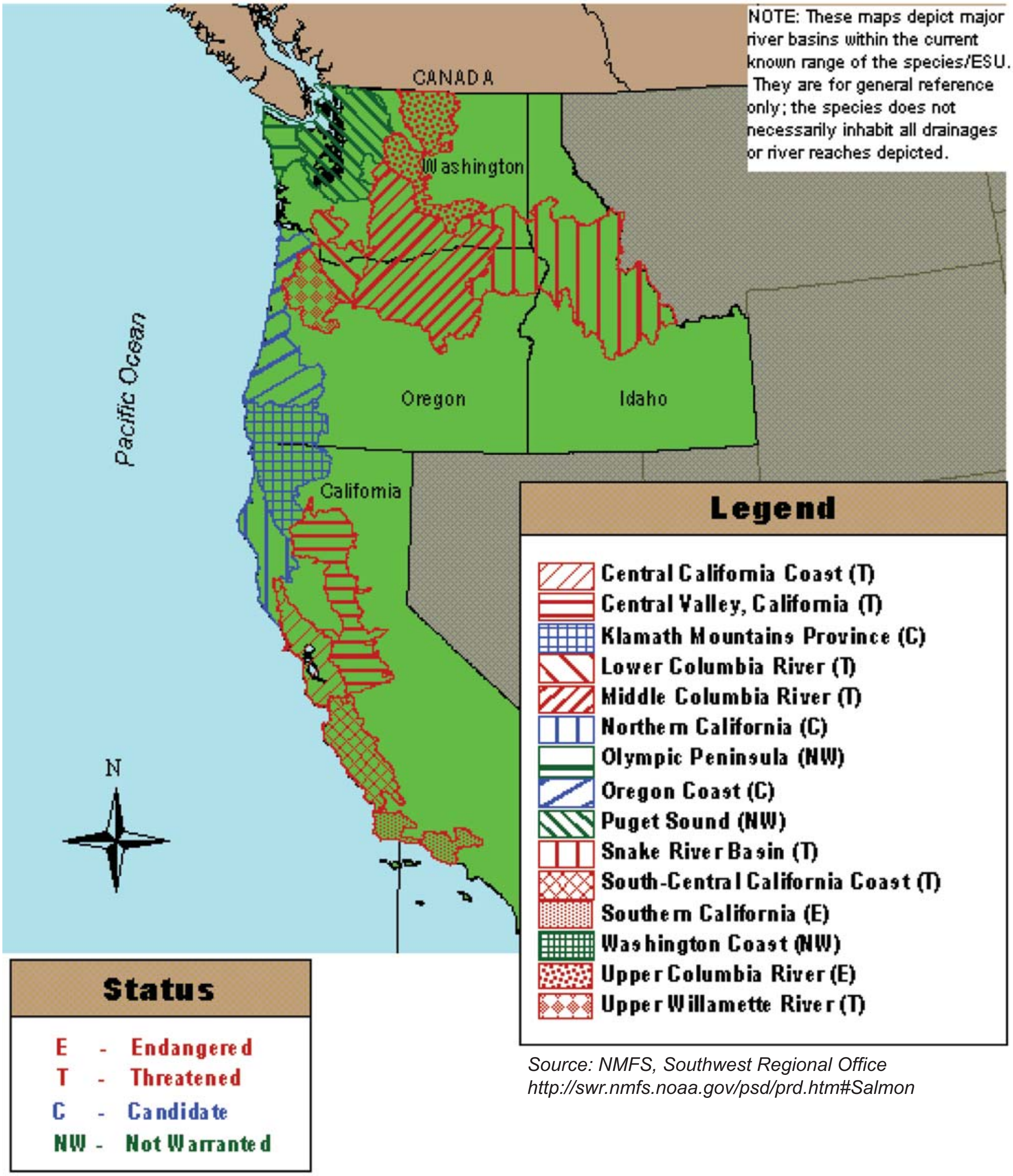
The primary habitat requirements for anadromous salmonids during the winter diversion season are passage, spawning, incubation, and winter rearing. In general, spawning habitats in Policy Area streams tend to be more evenly distributed in lower gradient channels, while in higher gradient channels, spawning areas are sporadic and often limited to distinct patches or pockets, a result of gravel supply, transport, and deposition patterns.

The ability of anadromous salmonids to use these spawning habitats and negotiate passage barriers in the Policy Area is strongly dependent on flow magnitude and duration, stream gradient, and channel shape and size (Rantz 1964; MTTU 2000, cited in R2 Resource Consultants 2007). In the smallest streams, passage may occur only during high water events. Spawning occurs in areas with suitable gravel quality and quantity, during freshets and/or winter base flows. Winter rearing generally requires deeper water and cover that can be provided in the form of large substrate, overhanging vegetation, or undercut banks.

In Policy Area streams, the availability of rearing habitat is generally controlled by summer and winter base flows. A more detailed description of anadromous salmonids habitat requirements, specifically as they are related to certain Policy elements, is provided in appendix D of R2 Resource Consultants 2007.

4.6.1 Listing of Salmonid Species under Federal and State Endangered Species Acts

NMFS and CDFG listed coho salmon as “threatened” under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA), respectively, in 1996, followed in later years by the listing of steelhead and Chinook salmon. In 2005, the status of coho salmon was upgraded to “endangered” under both the ESA and CESA. NMFS and CDFG identified critical habitat for steelhead and Chinook salmon on a stream-by-stream basis in the Policy Area. Critical habitat for coho is defined by NMFS as any accessible stream within the current range of designated populations, excluding habitat above a specific number of impassable dams but including habitat above culverts. The listing of these fish under the federal and state endangered species acts led to the need for the evaluation of the impacts of water diversions on anadromous salmonids. Figures 4-4a through c show major river basins within the current known ranges of steelhead, coho, and Chinook salmon.



Source: NMFS, Southwest Regional Office
http://swr.nmfs.noaa.gov/psd/prd.htm#Salmon

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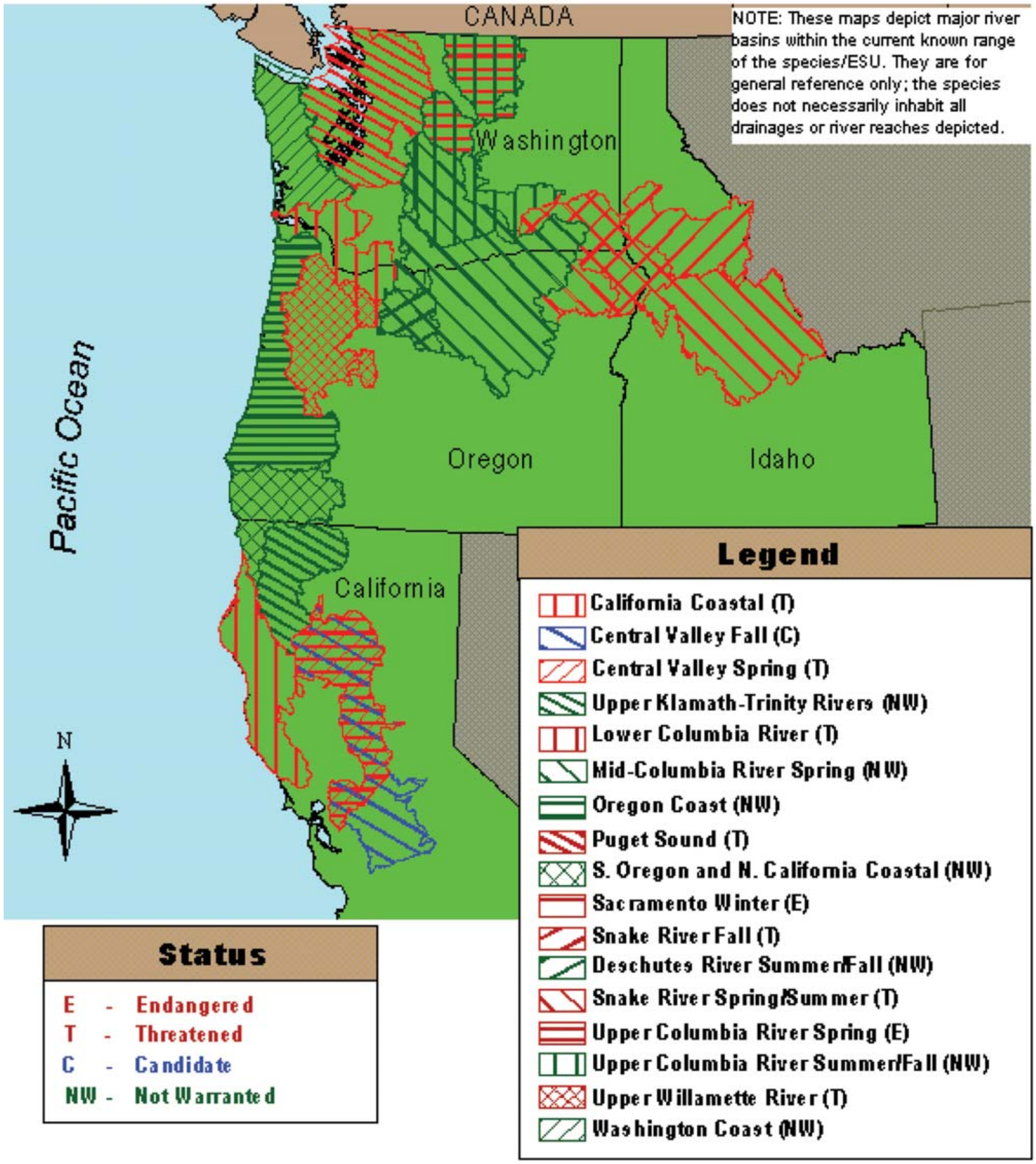
Figure 4-4a

NMFS Map Showing Range of Steelhead Distinct Population Segments



Source: NMFS, Southwest Regional Office
http://swr.nmfs.noaa.gov/psd/prd.htm#Salmon

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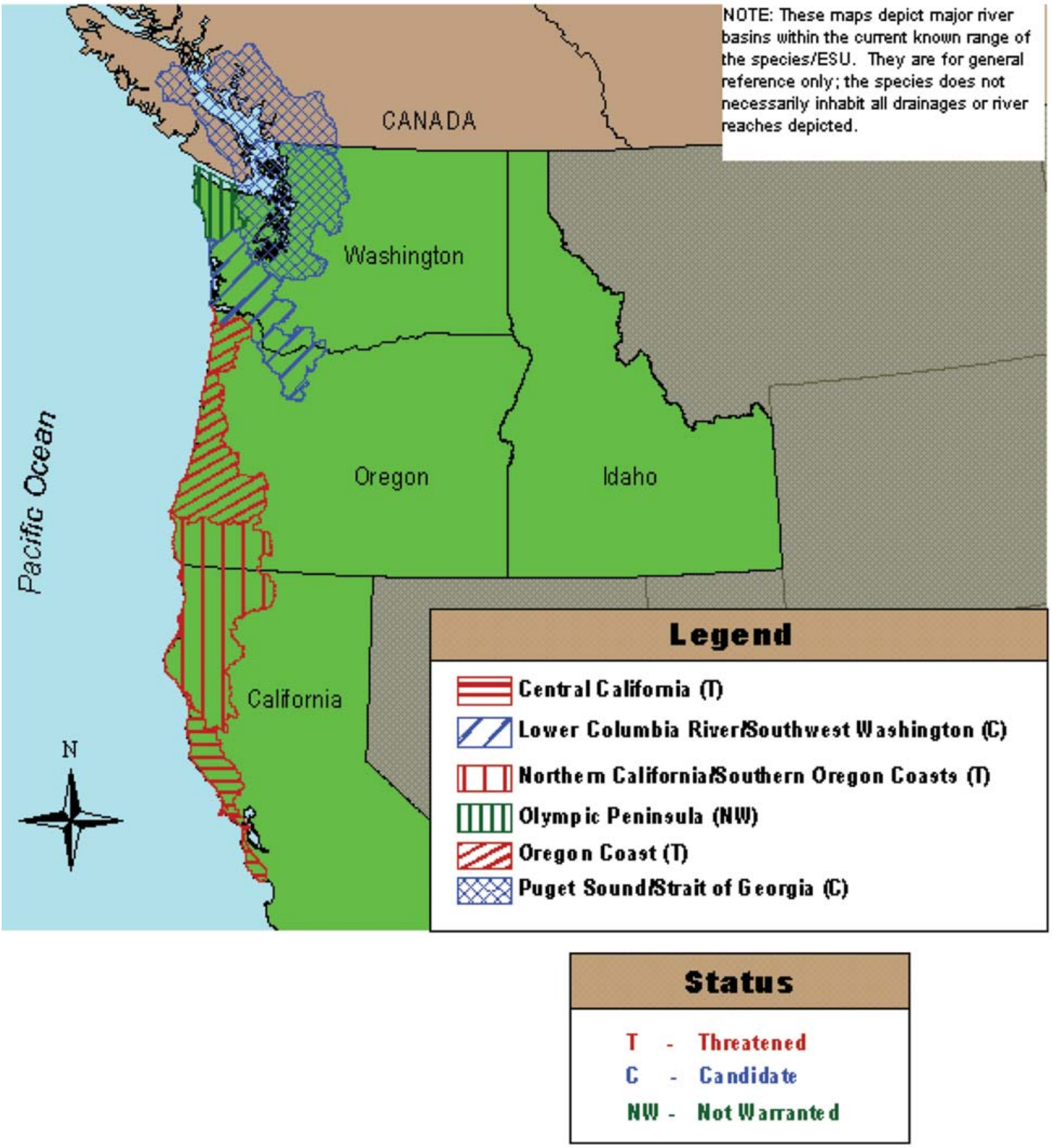
Figure 4-4b
NMFS Maps Showing Range of Chinook Salmon Evolutionarily Significant Units



Source: NMFS, Southwest Regional Office
http://swr.nmfs.noaa.gov/psd/prd.htm#Salmon

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Figure 4-4b
NMFS Map Showing Range of Coho Salmon Evolutionarily Significant Units

The listing status and ranges of the listed anadromous salmonid species within the Policy Area are provided in table 4-1. The table also shows the dates they became listed under either the ESA or the CESA, or both, and, in some cases, the dates their listing status was reaffirmed.

Table 4-1. State and Federal Special-Status Species of Anadromous Salmonids in the Policy Area

COMMON NAME	STATE STATUS	FEDERAL STATUS	POPULATION RANGE
Coho salmon – Central California Coast ESU* *(Oncorhynchus kisutch)*	Endangered (3/30/05)	Endangered (8/29/05)	From the San Lorenzo River in Santa Cruz County north to Punta Gorda (in Humboldt County), including tributaries to San Francisco Bay, but excluding the Sacramento–San Joaquin River system
Coho salmon – Southern Oregon/ Northern California Coasts ESU *(Oncorhynchus kisutch)*	Threatened (3/30/05)	Threatened (6/5/97)	From Punta Gorda north to Cape Blanco, Oregon
Steelhead – Northern California DPS* (*Oncorhynchus mykiss irideus*)	Species of Special Concern (Mattole River summer run only)	Threatened (6/7/00; 1/5/06)	From Redwood Creek southward to the Gualala River
Steelhead – Central California Coast DPS (*Oncorhynchus mykiss irideus*)		Threatened (8/18/97; 1/5/06)	From the Russian River south to Aptos Creek (Santa Cruz Co.), and the drainages of San Francisco, San Pablo, and Suisun Bays, including the tributary streams to Suisun Marsh, but excluding the Sacramento–San Joaquin River system
Chinook salmon – California Coastal ESU *(Oncorhynchus tshawytscha)*		Threatened (9/16/99; 6/28/05)	South of the Klamath River to the Russian River

*The term Evolutionarily Significant Unit (ESU) refers to a population of organisms that is considered distinct for purposes of conservation and for listing under the federal Endangered Species Act. The concept refers not to taxonomic groupings but to identifiable populations that are substantially reproductively isolated from other conspecific populations and that represent important components of the evolutionary legacy of the species. NMFS's ESU policy for Pacific salmon defines the criteria for identifying a Pacific salmon population as a distinct population segment (DPS), which can be listed under the ESA (NMFS 2007).

4.6.2 Description of Salmonid Species

Steelhead

There are two basic life history types of steelhead: summer (stream-maturing) steelhead and winter (ocean-maturing) steelhead. Steelhead in the Policy Area are primarily winter steelhead. Within the

Policy Area, summer steelhead are found only in the Mattole River (Moyle 2002, cited in R2 Resource Consultants 2007).

Winter steelhead upstream migration generally extends from November through May, peaking in most Policy Area streams during January and February. Winter steelhead spawn within a few weeks to a few months from the time they enter fresh water. Peak spawning occurs during January through March, but can extend into spring and early summer months. Summer steelhead, on the other hand, enter the Mattole River between March and June and hold over the summer until late winter and spring of the following year before spawning (Downie et al. 2002, cited in R2 Resource Consultants 2007). The eggs hatch in approximately 3 to 4 weeks, with fry emerging from the gravel 2 to 3 weeks later. The fry then move to shallow protected areas associated with the stream margin for several weeks (Moyle 2002, cited in R2 Resource Consultants 2007).

Steelhead typically spend 2 years in freshwater, but freshwater residence time can range from 1 to 4 years (McEwan and Jackson 1996, Moyle 2002, cited in R2 Resource Consultants 2007). Emigration in the Policy Area usually occurs in late winter and spring and in some cases in the late fall months. Steelhead typically spend 1 to 2 years in the ocean before returning to spawn for the first time. In addition, steelhead are iteroparous[31] and may return to the ocean and spawn again in a later year.

Coho Salmon

In California, coho salmon have a relatively strict 3-year life cycle, spending about half of their lives in fresh water and half in salt water (Moyle 2002, cited in R2 Resource Consultants 2007). Upstream migration occurs primarily from October through January, with peak migration occurring during November and December. Peak spawning for coho salmon occurs during the months of December and January, taking place in small streams in the Policy Area. The eggs hatch after incubating in the gravels for 8 to 12 weeks (Moyle 2002, cited in R2 Resource Consultants 2007). After hatching, the alevins[32] remain in the gravel for 4 to 10 weeks depending on current water temperatures. Upon emergence, coho salmon fry tend to move to shallow water areas where they feed and continue to grow into juveniles. Juvenile coho rear and overwinter in the stream until the following March or early April, when, after smoltification, they begin migrating downstream to the ocean. In California, peak downstream migration occurs from April to late May/early June.

Chinook

Adult Chinook salmon begin returning to the Russian River as early as late August through January, but most upstream migration occurs in late October through mid-December (Steiner 1996, Chase et al. 2000, Chase et al. 2001, cited in R2 Resource Consultants). The location of spawning will vary from one year to another depending on the timing and amount of fall and winter rains (Flosi et al. 1998, cited in R2 Resource Consultants 2007). The eggs hatch within 4 to 6 weeks and young salmon generally begin outmigration soon after they emerge from the substrate in spring. Initially, fry move downstream into back- or edge-water areas of lower velocities and adequate cover and food. As juveniles grow larger, they move into deeper and faster water (Moyle 2002, cited in R2 Resource Consultants).

[31] The term “iteroparous” refers to species that reproduce repeatedly during their lifetime.
[32] The term “alevins” refers to the developmental life stage of young salmonids between the egg and fry stage.

4.6.3 Decline of Salmon and Steelhead Fisheries in the Project Area

Salmonid fisheries in the project area have experienced substantial declines over the last 100 years. The most notable decline in the numbers of naturally spawning salmon and steelhead in the Russian River Basin have occurred since the 1950s (Steiner 1996, SWRCB 1997, cited in R2 Resource Consultants 2007), when extensive development, water use, dam construction and other factors began to impact steelhead and coho production. Populations of natural spawning coastal coho salmon are significantly lower than they were in the 1960s, a result of habitat loss, hatchery construction, and harvest (Brown et al. 1994, cited in R2 Resource Consultants 2007). Important flow-related causes of decline are summarized below.

The two largest dams in the Russian River basin, Coyote Valley and Warm Springs, were completed in 1959 on the East Fork of the Russian River and in 1982 on Dry Creek, respectively. These dams blocked a major fraction of the available high-quality spawning habitat for steelhead in the basin. Hatcheries were constructed as mitigation, resulting initially in the introduction of Chinook, coho, and steelhead from other regions. A variety of effects are thought to have occurred in response to hatchery operations, including loss of genetic fitness, introduction of disease, increased juvenile competition, and fishing pressure on adults (Steiner 1996, cited in R2 Resource Consultants 2007). Extensive dam construction has also occurred in the Lagunitas Creek Basin in Marin County for municipal water supply, resulting in the loss of substantial amounts of steelhead and coho spawning habitat (State Water Board 1995, Brown et al. 1994, cited in R2 Resource Consultants 2007). In addition, smaller water supply projects are scattered throughout the project area.

Flow hydrographs have been altered substantially in the mainstem Russian River and in Dry Creek in response to dam construction and intra-basin diversion from the Eel River to the Russian River. Summer flows are higher than they were historically, and winter peak flows are attenuated (Steiner 1996, cited in R2 Resource Consultants 2007). The same is true for Lagunitas Creek (State Water Board 1995, cited in R2 Resource Consultants 2007). Increased summer flows in the Russian River mainstem, combined with high summer water temperatures below Cloverdale have contributed to a shift in species composition towards warm water species, both native and introduced. This in turn has led to increased predation and competitive pressures on juvenile salmonids (Steiner 1996, cited in R2 Resource Consultants 2007). Decreased winter flows have been associated with reduced bedload transport and degradation of spawning habitat by fine sediment accumulations in Lagunitas Creek (McEwen and Jackson 1996, cited in R2 Resource Consultants 2007).

Agricultural and municipal water needs have led to the construction of numerous smaller dams and diversion structures on headwater and downstream tributaries, particularly in the Russian, Navarro, and Napa river basins (Steiner 1996, Abbott and Coats 2001, Stillwater Sciences 2002, cited in R2 Resource Consultants 2007). Several low-head structures have also been constructed on the mainstem Russian River. These dams and structures have collectively blocked upstream passage of adult salmon and steelhead, altered the hydrograph including attenuating peaks and reducing summer flows, and interrupted bedload transport. These changes have in turn led to increased summer water temperatures, loss of spawning substrates, riparian vegetation loss or encroachment, and channel incision downstream.

The resulting physical changes have variously impacted spawning and rearing habitat quantity and quality in mainstem and tributary channels. Channel incision has been noted to lead to passage barriers at headcuts and over-steepened locations, particularly in Russian River and some Napa River tributaries. Down-cutting and groundwater pumping have led to lowering of water tables, vertical bank creation, and corresponding impacts to the riparian zone. Tributary habitat has been thought to be the limiting factor in the Russian River basin. In smaller streams, dams and water diversion have also reduced the availability of upstream passage and spawning flows for anadromous salmonids (Steiner 1996, MTTU 2000, Stillwater Sciences 2002, cited in R2 Resource Consultants 2007).

Other physical habitat and water quality changes have occurred largely due to various forms of rural and urban development and land use in the Russian River, Navarro River, Petaluma River, Sonoma Creek, Napa River, and various southern coastal and North Bay streams. The changes have particularly impacted summer rearing habitat for anadromous salmonid juveniles, in the form of reduced pool habitat area, reduced riparian habitat, increased water temperatures, decreased dissolved oxygen levels due to fertilizer and sewage discharge, and increased point and non-point pollution. Sedimentation of spawning habitat has been noted as a significant problem in the Napa River basin (Steiner 1996, Abbott and Coats 2001, Stillwater Sciences 2002, cited in R2 Resource Consultants 2007).

Most coastal rivers and streams north of the Russian River have been impacted more by timber harvest activities than by water use. In general, there is a gradual shift in impacts from timber harvest towards water diversion and grazing with decreasing latitude. The Navarro River and, to a lesser extent, the Garcia River represent transition basins in that they have experienced varying levels of timber harvest, water use, and grazing impacts. Timber harvest-related impacts to salmonids in the more northern coastal basins have occurred in the form of increased sedimentation of spawning habitat through road and landslide inputs, and loss of large wood and concomitant habitat complexity. Impacts from grazing in the more southern coastal basins have similarly included sedimentation, loss of riparian habitat, and channel incision (Kelley 1976, Mendocino County 1984, MCRCD 1992, State Water Board 1998a, Entrix et al. 1998, CDFG 2001, cited in R2 Resource Consultants 2007).

4.7 Special-Status Species and Sensitive Communities

The Policy Area supports a rich diversity of special-status species and other sensitive biological features and communities, including species and communities associated with streams and rivers subject to the Instream Flow Policy. Special-status species refer to plant and animal species that are listed or under consideration for listing under the federal and state endangered species acts, as well as species accorded special protection under the Fish and Game Code or described as “species of special concern” by CDFG, and species and communities listed by the California Native Plant Society. Special-status plants that occur in riparian, freshwater marsh, and vegetated lacustrine habitats are listed in appendix B to this document. Special-status animals that occur in these habitats are listed in appendix C.

4.8 Land Use and Planning

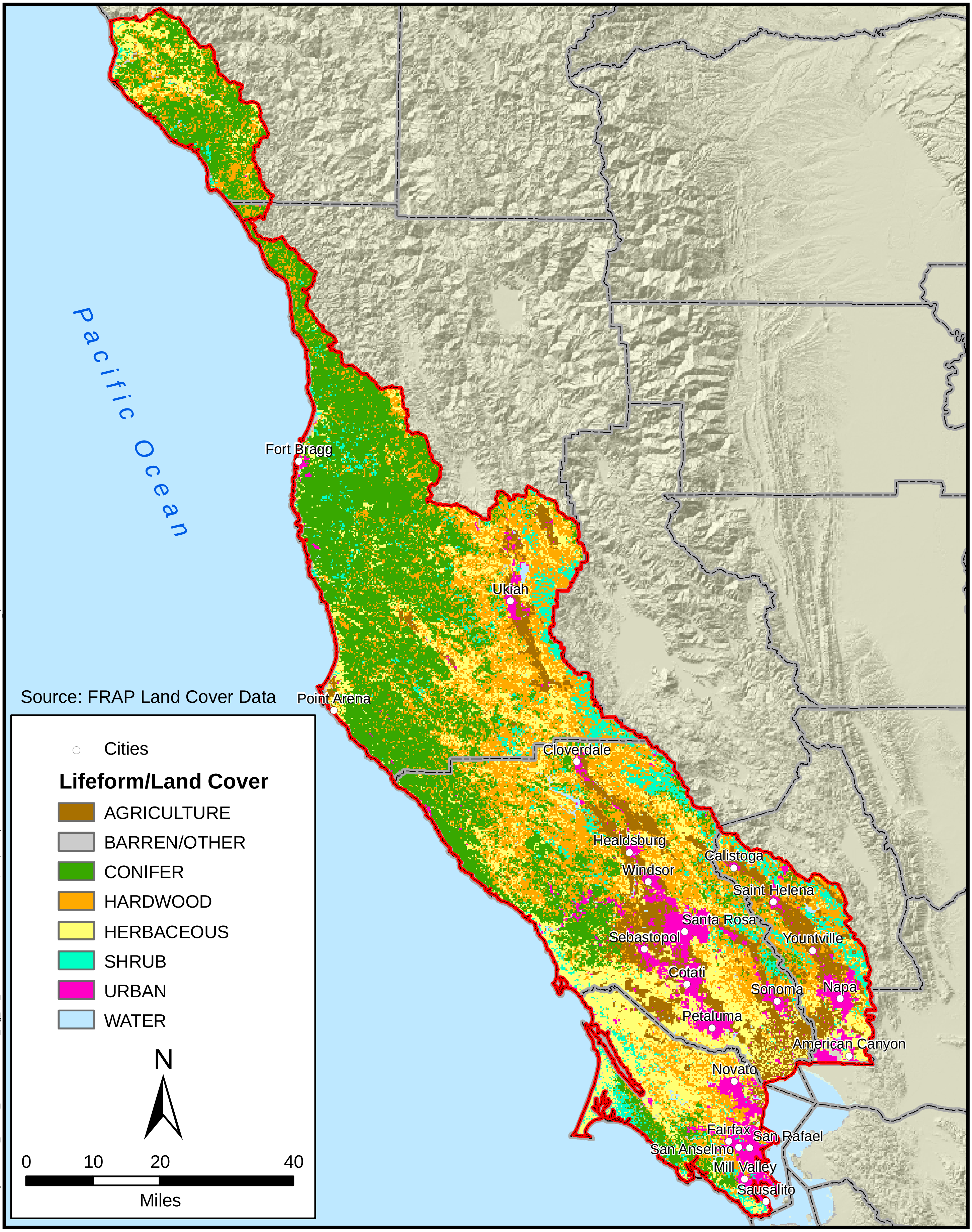
Land uses in the Policy Area consist of a diverse mix of natural resource lands, agricultural, rural residential, and urban uses (figure 4-5). Natural resource areas within the Policy Area include lands used for timber production, agriculture, recreation, open space, and habitat protection. The hilly and mountainous topography, multitude of ridges and valleys, coastal terraces and tidal flats, and the rivers and streams of the Policy Area were all important factors in the patterns of human settlement, development, and land use in the Policy Area. The Policy Area as a whole is not heavily populated, particularly in the north and in the coastal and interior mountainous areas; however, the number of developed communities and the population densities, or people per square mile, increase toward the southern portion of the Policy Area. Population centers are more prevalent in the wider valleys, along the coast, in proximity to major rivers, and near San Francisco Bay and San Pablo Bay. Figure 4-6 shows the population distribution across the Policy Area.

Agricultural production, including timber production, is a major land use—and economic force—in the Policy Area. While the ranking of particular crops and their gross total values vary from year to year, major agricultural commodities in the Policy Area include wine grapes, timber, cattle, dairy products, and a variety of other crops, such as apples, pears, poultry, strawberries, fish, and field crops. Table 2 shows the top five agricultural crops by county as reported by the counties to the California Farm Bureau.

Table 4-2. Top Five Crops by Value ($ million) in Policy Area Counties, 2005/2006

HUMBOLDT (2006)		MENDOCINO (2005)		SONOMA (2006)		MARIN (2005)		NAPA (2006)	
Timber	$171.6	Wine grapes	$72.6	Wine grapes	$430.5	Milk	$31.2	Wine grapes	$469.1
Nursery products	$49.1	Timber	$53.9	Milk	$67.2	Cattle and calves	$7.7	Nursery crops	$3.6
Milk	$29.7	Bartlett pears	$10.2	Livestock and poultry	$25.4	Pasture and range	$4.5	Cattle and calves	$3.1
Cattle and calves	$19.8	Cattle and calves	$9.2	Cattle and calves	$11.3	Fish	$3.3	Straw-berries	$0.6
Pasture and range	$8.7	Field crops	$4.8	Nursery orna-mentals	$9.4	Livestock	$1.9	Livestock products	$0.5

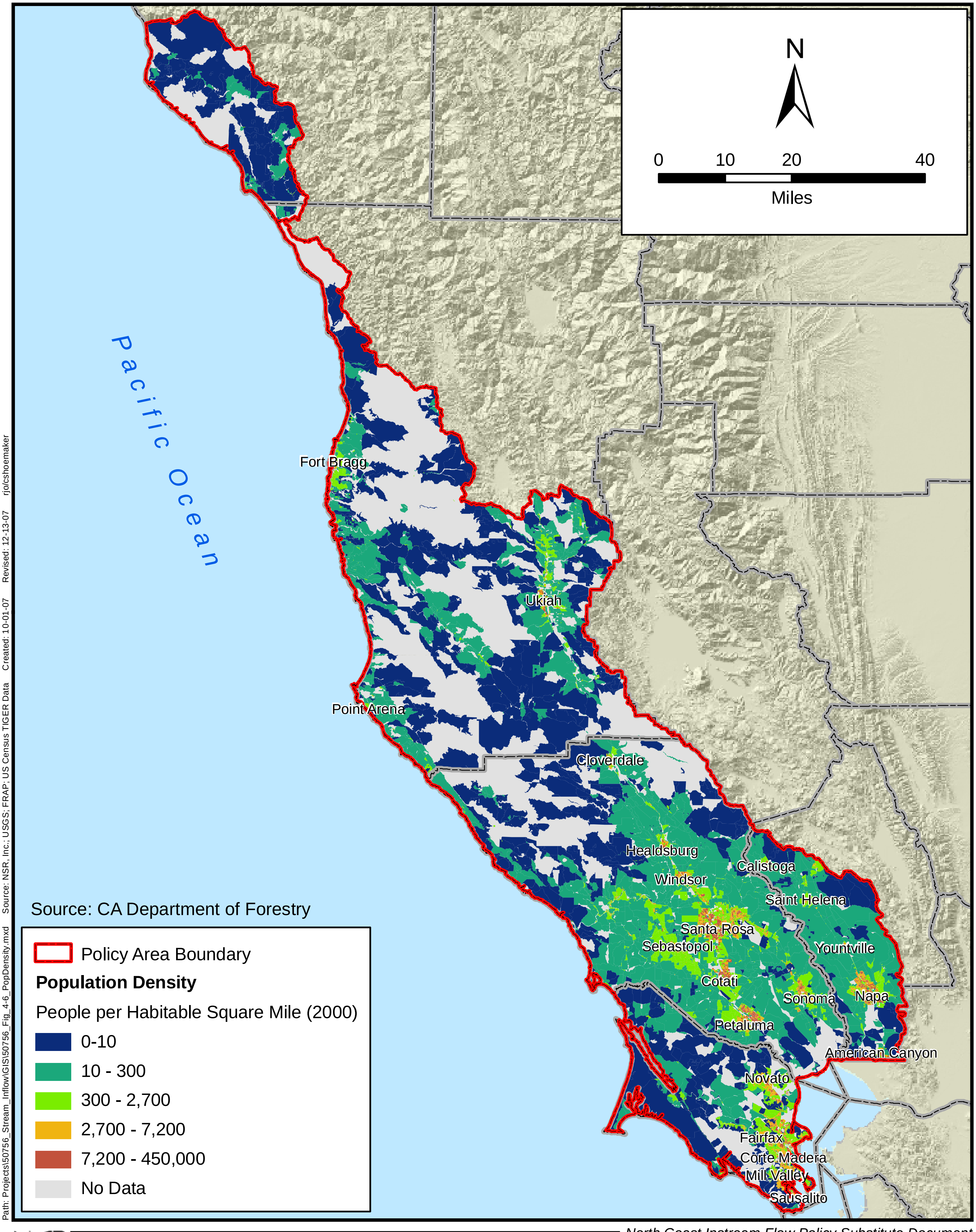
Source: California Farm Bureau



Path: \Projects\50756_Stream_Inflow\GIS\50756_Fig_4-5_LandUse.mxd Source: NSR, Inc.; ESRI; FRAP Created: 10-01-07 Revised: 12-13-07 rjo/cshoemaker

North State Resources, Inc.

Figure 4-5
Lifeform/Land Cover Map



North State Resources, Inc.

Figure 4-6
Population Density

Water use varies according to crop and type of operation; much of the irrigated farmland is concentrated within the Napa and Sonoma valleys and other relatively level areas in the Russian River watershed and in areas draining to San Pablo Bay. Water is required for dairy operations along the coast and cattle operations interspersed throughout the Policy Area. Some agricultural lands are non-irrigated and grazing lands.

The California Department of Conservation produces Important Farmland Maps by county as part of the Farmland Mapping and Monitoring Program. Humboldt County has not been surveyed to date, and Mendocino County data will be included in the 2006 maps (not currently available). A classification system that combines technical soil ratings and current land use is the basis for the Important Farmland Maps (California Division of Land Resource Protection 2004). Table 4-3 shows Important Farmland Map acreages for Sonoma, Napa, and Marin counties.

Table 4-3. Important Farmland[1] Acreage in Mapped Policy Area Counties, 2004

	IRRIGATED FARMLAND			NONIRRIGATED	
COUNTY	PRIME	STATEWIDE	UNIQUE	LOCAL	GRAZING LAND
Sonoma[2]	36,377	19,747	31,173	74,851	421,126
Napa	32,446	9,792	17,811	19,279	179,905
Marin	7	445	256	65,750	89,938

Source: California Department of Conservation, Division of Land Resource Protection, 2004

1 The Department of Conservation, Division of Land Resource Protection maps the Important Farmland in the state. “Prime” farmland, “Farmland of Statewide Importance,” and “Unique” farmland are categories of Important Farmland. These categories are defined on the Department’s website at http://www.conservation.ca.gov/dlrp/fmmp/mccu/Pages/map_categories.aspx.

2 Sonoma County data are available only for 2002

Major transportation corridors in the Policy Area include Highway 101, which is a major north-south artery in the state; Route 20, which carries traffic from Lake County and points east into Mendocino County, and then continues to the coast; Route 1, which follows the coast either closely or at a distance throughout much of the Policy Area; Route 29 in Napa Valley and Route 12 in Sonoma Valley; Route 116 from Sonoma to the coast; Route 128 from Napa to the coast; and Route 37 around the top of San Pablo Bay. Table 4-4 lists officially designated state scenic highways in the five counties located in the Policy Area; there are no national scenic byways in the Policy Area.

Table 4-4. Officially Designated State Scenic Highways in and near the Policy Area

COUNTY	HIGHWAY/ROUTE	LOCATION	MILEPOSTS
Sonoma	12	From Danielli Avenue east of Santa Rosa to London Way near Aqua Caliente	22.450 – 34.024
Sonoma	116	From State Route 1 to South City Limit Sebastopol	0.0 – 27.817

Source: California Department of Transportation 1999

Two rivers in the Policy Area are listed under the California Wild and Scenic Rivers Act: the Albion River, which is listed for its recreational values, and the mainstem Gualala River from the confluence of the North and South Forks to the Pacific Ocean, which is also listed for its recreational values. There are no federally designated wild and scenic rivers located in the Policy Area.

The Policy Area contains 36 parks, beaches, reserves, historic parks, recreation areas, and other properties within the State Park system:

- State Parks: Annadel, Bothe-Napa Valley, China Camp, MacKerricher, Manchester, Mendocino Headlands, Mendocino Woodlands, Mount Tamalpais, Navarro River Redwoods, Robert Louis Stevenson, Russian Gulch, Salt Point, Samuel P. Taylor, Sinkyone Wilderness, Sugarloaf Ridge, Tomales Bay, Van Damme
- State Beaches: Greenwood, Schooner Gulch, Sonoma Coast, Westport-Union Landing
- State Reserves: Caspar Headlands, Hendy Woods, Jug Handle, Kruse Rhododendron, Mailliard Redwoods, Montgomery Woods
- State Historic Parks: Bale Grist Mill, Fort Ross, Jack London, Marconi Conference Center, Olompali, Petaluma Adobe, Sonoma
- State Recreation Areas: Austin Creek
- Other Park Properties: Point Cabrillo Light Station

4.8.1 California Coastal Zone

The Policy Area includes areas located with the state coastal zone. The extent of the zone varies in size throughout the Policy Area. Seaward, the coastal zone extends to the state's outer limit of jurisdiction; inland, it generally extends 1,000 yards from the mean high tide line of the Pacific Ocean. In some significant coastal estuarine, habitat, and recreational areas, the coastal zone extends inland to the first major ridgeline paralleling the sea or 5 miles from the mean high tide line of the sea, whichever is less, and in developed urban areas the zone generally extends inland less than 1,000 yards. It does not does not include the San Francisco Bay area, where development activities fall under the jurisdiction of the San Francisco Bay Conservation and Development Commission.

The California Coastal Act[33] was enacted by the State Legislature in 1976 to provide long-term protection for environmental and human-based resources along California's 1,100-mile coastline for the benefit of current and future generations. The Coastal Act made permanent the Coastal Commission, which had been initially established by voters in 1972. In addition to state-wide offices in San Francisco and Sacramento, the Coastal Commission maintains district offices. Humboldt and Mendocino Counties are part of the North Coast Area; Sonoma and Marin Counties are part of the North Central Coast Area.

Cities and counties within the coastal zone are required to adopt a local coastal program that is consistent with the policies of the Coastal Act. After certification by the Coastal Commission of a local coastal program, coastal development permit authority is delegated to the appropriate local government; however, the Coastal Commission retains permit jurisdiction over certain specified lands, including tidelands and public trust lands. The Commission also has appellate authority over

[33] California Public Resources Code sections 30000 et seq.

development approved by local governments in specified geographic areas as well as certain other developments.

The policies of the Coastal Act constitute the statutory standards applied to planning and regulatory decisions made by the Commission and by local governments. Coastal policies address a broad range of overlapping issues, including protection of public shoreline access, promotion of coastal recreation and affordable visitor accommodations, protection of environmentally sensitive habitat, conservation of coastal agricultural lands, support for commercial fisheries and coastal-dependent industrial uses, water quality, offshore oil and gas development, transportation, power plants, ports, and public works.

4.8.2 Local Land Use

Local agencies in California have primary responsibility for land use control and regulation within their areas of jurisdiction and, to a lesser extent, to areas within their “spheres of influence.” State planning and zoning law requires all California counties and incorporated cities to prepare, adopt, and implement a comprehensive general plan to guide the community’s growth and development. A general plan is a community’s basic vision and “blueprint” for the future, and typically provides policies in a many areas pertaining to conservation and development.

Under state planning law, a general plan is required to contain seven elements: land use, open space, transportation/circulation, housing, safety, noise, and conservation. A general plan may also include optional elements at the discretion of the local agency, such as an agricultural element or a recreation element. Water resources and use issues are typically addressed in a general plan in terms of natural resource values as well as an essential requirement for land use and development. Cities within the Coastal Zone may integrate coastal policies into their general plans. The general plan is commonly implemented through zoning and other local land use and development ordinances, which must be consistent with the general plan.

In reviewing and making decisions on applications for various land use entitlements and development projects, the local agency must typically make findings that the proposed activity (e.g., a conditional use permit or a subdivision of real property) is consistent with its general plan. If the decision is discretionary and the project could have an effect on the physical environment, then the county or city is also obligated to comply with the procedural and documentation requirements of CEQA. Among other considerations for analyzing the potential effects of projects on water resources, CEQA contains requirements for agencies to evaluate the potential effects of large projects on public water systems, in coordination with the water agency, to ensure that sufficient water supply is available before approving large subdivisions, commercial office buildings, industrial parks, and similar projects.

5 ALTERNATIVES TO THE PROPOSED POLICY

The State Water Board solicited alternative policy proposals for consideration as part of its scoping efforts for the Policy. CEQA requires that a lead agency analyze a reasonable range of alternative methods of achieving the goals of a project. The Policy is composed of separable policy elements. The State Water Board has combined specific elements in the proposed Policy, which in combination maintain streamflows and provide protection to aquatic resources.

This section describes other comprehensive Policy alternatives considered by the State Water Board. It also describes alternative Policy elements that the State Water Board considered including in its Policy, but did not, because they did not best meet the goals of the project. For the purposes of this assessment, alternatives to the proposed Policy include the “No Policy Alternative,” the adoption of the CDFG-NMFS Draft Guidelines, and a “Maximum Protectiveness Alternative.” These alternatives are discussed in sections 5.1 through 5.3, below. The individual Policy elements that were considered in the development of the Policy are discussed in section 5.4. Both the comprehensive Policy alternatives and the individual Policy elements were analyzed to determine how well they met the project goals and principles described in section 2.

5.1 No-Project Alternative

The State Water Board is required by Water Code section 1259.4 to adopt “principles and guidelines for maintaining instream flows in coastal streams” within the Policy Area, as discussed previously. Thus, because the State Water Board is statutorily obligated to adopt a policy for instream flow, a “No-Policy Alternative” is neither feasible nor reasonable. Nevertheless, for environmental impact assessment purposes, consideration is given to a “No-Project Alternative” (in this case, synonymous with a “No-Policy Alternative”) for comparison to the impacts that would result from approval of the proposed project (i.e., adoption of the proposed Policy).

Under the No-Project Alternative, the State Water Board would not adopt principles and guidelines for maintaining instream flow to protect anadromous salmonids and their habitat as part of state policy for water quality control. Instead, the State Water Board would continue to administer the water right program on a case-by-case basis in accordance with its current practices and statutory requirements. In administering its water right program, the State Water Board could apply the CDFG-NMFS Draft Guidelines when evaluating applications to appropriate water. The draft guidelines would also allow applicants to conduct and submit site-specific studies for specific water diversions. The State Water Board would make findings regarding the availability of unappropriated water, considering the existing rights of senior water users and fish and wildlife, and apply the public trust doctrine, where feasible.

5.2 CDFG-NMFS Draft Guidelines Alternative

This alternative assumes that the State Water Board would adopt as policy the CDFG-NMFS Draft Guidelines. The intent of the CDFG-NMFS Draft Guidelines is to preserve stream flows to ensure that anadromous salmonids are protected from the deleterious effects of excessive water diversion.

CDFG and NMFS recommended that these guidelines be used by permitting agencies (including the State Water Board), planning agencies, and water resources development interests when taking actions that would divert water from northern California coastal streams. The State Water Board currently takes these guidelines into consideration when reviewing water right applications and petitions; however, the CDFG-NMFS Draft Guidelines have not been adopted by CDFG, NMFS, or the State Water Board as formal policy.

The CDFG-NMFS Draft Guidelines contain measures intended to protect instream flow for salmonids: seasonal limits on additional diversions, maintenance of minimum bypass flows, protection of the natural hydrograph, and special circumstances for allowing onstream reservoirs. The joint guidelines also allow, under specified conditions, site-specific studies to evaluate whether additional water diversions, onstream dams, and/or a reduction in protective measures could be allowed without adversely affecting anadromous salmonids and their habitats.

The State Water Board is authorized by Water Code section 1259.4 to consider the CDFG-NMFS Draft Guidelines for purposes of water right administration. For the purposes of this substitute document, the CDFG-NMFS Draft Guidelines, summarized below, are considered in their entirety as an alternative to the proposed Policy. In addition to the consideration of the CDFG-NMFS Draft Guidelines, this substitute document also reviews and compares the main protective elements of the CDFG-NMFS Draft Guidelines against other possible alternative elements.

The CDFG-NMFS Draft Guidelines recommend that terms and conditions be included in new water right permits for small diversions[34] to protect fishery resources in the absence of site-specific biologic and hydrologic assessments. The CDFG-NMFS Draft Guidelines recommend limiting new water right permits to diversions during the winter period (December 15–March 31) when stream flows are generally high; maintaining minimum bypass flows and cumulative maximum rates of diversion to ensure that streams are adequately protected from new winter diversions; conserving the natural hydrograph and avoiding significant cumulative impacts by limiting the maximum cumulative volume of water that can be diverted in a watershed; constructing storage ponds offstream rather than onstream; and providing fish screens and fish passage facilities where appropriate. Some of the main provisions of the CDFG-NMFS Draft Guidelines are listed below.

- Guidelines for larger diversions. For larger diversions in streams with anadromous salmonid habitat that withdraw more than 3 cfs or 200 acre-feet per year, water right permit applicants must consult NMFS and CDFG and develop a site-specific study for the purpose of determining appropriate flow-related terms and conditions to be incorporated in the permitted water right. The study should include a “habitat-based stream needs assessment” addressing habitat, species, and life history criteria; an evaluation of the existing level of diversion-related impairment and limiting factors; a proposal to provide periodic channel maintenance and flushing flows that are representative of the natural hydrograph; and a plan to monitor effectiveness of the stipulated flows.
- Guidelines for smaller diversions. For diversions in streams with anadromous salmonid habitat that withdraw less than or equal to 3 cfs and less than or equal to 200 acre-feet per year, the CDFG-NMFS Draft Guidelines defer to “default guidelines,” based on hydrology

[34] Small diversions are defined as direct diversions of 3 cubic feet per second (cfs) or less, or diversions to storage of 200 acre-feet per annum or less.

and life history requirements of resident salmonids in the North Coast area. These default guidelines are intended to be used in lieu of results from site-specific biological studies.

- Seasonal limits. Under the CDFG-NMFS Draft Guidelines, the diversion season is limited to the period from December 15 to March 31.
- No additional permitting of small onstream reservoirs. Water diversion projects requiring new permits should avoid construction of onstream dams or reservoirs; thus, storage must be offstream. Some exceptions are provided for Class III streams.
- Maintenance of minimum bypass flows. In the absense of site-specific data, the minimum bypass flow would not be less than the estimated February median flow at the point of diversion.
- Protection of the natural hydrograph and avoidance of cumulative impacts. Absent compelling site-specific biological and hydrologic information and analyses demonstrating otherwise, the natural hydrograph should be protected by either:
    - Limiting the cumulative instantaneous rate of withdrawal to 15 percent of the winter 20 percent excedance flow during the period between December 15 and March 31, subject to a limiting cumulative rate of withdrawal that does not appreciably diminish (qualified as less than 5 percent of) the natural hydrograph flows needed for channel maintenance and upstream fish passage; or
    - Limiting the total cumulative volume of water to be diverted at historical limits of anadromy to 10 percent of the unimpaired runoff during the period between October 1 and March 31 during normal water years.
- Fish passage and protection measures. If anadromous salmonids are likely to ascend the stream to the point of diversion, then adequate passage facilities and screening of the diversion intake must be provided, in accordance with NMFS and CDFG criteria.
- Special circumstances allowing onstream reservoirs. Additional permitting of small onstream reservoirs should be avoided except in cases where the following conditions are met: (i) the proposed diversion was located in a stream where fish or other aquatic species were not historically present; (ii) the project would not lead to a cumulative diversion rate exceeding 10 percent of the natural instantaneous flow in any reach where fish are at least seasonally present, and (iii) the project would not lead to dewatering of a fishless stream supporting other aquatic species.
- Procedure for assessing cumulative impacts of water diversions. Addendum A of the CDFG-NMFS Draft Guidelines describes a procedure for assessing the cumulative impacts of water diversions based on the cumulative total volume of diverted water. This procedure is conducted in the context of the water availability analysis. The potential level of impairment to stream flows is evaluated by calculating the "Cumulative Flow Impairment Index (CFII)."[35]

5.3 Maximum Protectiveness Alternative

In developing the proposed Policy, and in the consideration of alternatives in this substitute environmental document, the State Water Board considered whether a reasonable alternative could be

[35] See the CDFG-NMFS Draft Guidelines for additional details.

devised that would provide the “maximum” amount of protection for native fish populations, particularly anadromous salmonids and their habitat, while still providing for consideration of water right actions. Hypothetically, an alternative policy could be conceived that would establish guidelines and principles that would favor the protection of fisheries and fish habitat requirements above all other beneficial uses of waters from coastal streams in the Policy Area. Such an approach does not achieve the State Water Board’s project goal of minimizing water supply impacts that result from adoption of the Policy. In developing the Policy for purposes of water right administration, the State Water Board considered the constitutional mandate requiring that the water resources of the State be put to beneficial use to the “fullest extent to which they are capable.”[36] It also considered the Legislature’s legislative direction that when acting upon applications to appropriate water, the State Water Board shall be guided by the policy that domestic use is the highest use of water.[37] Accordingly, the State Water Board determined that an alternative that elevated the protection of fishery resources to the exclusion of all other beneficial uses is not feasible.

The Task 3 report (R2 Resource Consultants 2007, Chapters 5 through 8) identifies a range of alternatives for implementing each Policy principle. The Maximum Protectiveness Alternative combines each of the Policy element alternatives that provide the highest level of protection according to the assessment of protectiveness described in the Task 3. The resulting Maximum Protectiveness Alternative is composed of the following alternative Policy elements:

<u>Diversion Season</u>: Alternative DS1: December 15 through March 31

<u>Minimum Bypass Flow</u>: Alternative MBF3, according to the equations:

For drainage area (DA) < 290 mi^2, $Q_{MBF} = 8.7\ Q_m\,(DA)^{-0.47}$

For drainage area > 290 mi^2, $Q_{MBF} = 0.6\ Q_m$

Where Q_m = unimpaired mean annual flow (cfs) and DA = drainage area of the watershed at the point of diversion except for PODs on streams above anadromous habitat, where DA is determined at the upstream limit of anadromy.

<u>Maximum Cumulative Diversion Rate</u>: Alternative MCD1, 15% of 20% winter (12/15 to 3/31) exceedance flow.

<u>Permitting of Onstream Dams</u>:

Class I:	Alternative DP1.1. No water right permits will be issued
Class II:	Alternative DP2.1. No water right permits will be issued
Class III:	Alternative DP3.2. A water right permit may be considered for an onstream dam if the following criteria are met:

1. A passive bypass system is used to meet the minimum bypass flow and maximum rate of diversion requirements;
2. An exotic species eradication plan is implemented; and
3. A gravel and wood augmentation plan or bypass system is implemented.

[36] Cal. Const., art. X, §2.
[37] Wat. Code, § 1254.

5.4 Alternative Policy Elements

In the development of the proposed Policy, a number of Policy element alternatives were identified and assessed for protectiveness for anadromous salmonids and their habitat. The CDFG-NMFS Draft Guidelines elements were analyzed, as were criteria suggested by interest groups and members of the public. The details of these analyses are provided in the technical background studies (R2 Resource Consultants 2007). The Policy elements alternatives are described below.

5.4.1 Diversion Season Alternatives

Three alternatives for the diversion season (DS) element were identified and assessed. They are listed below in table 5-1. "DS 1" is used to identify the CDFG-NMFS Draft Guidelines, "DS 2" is used to identify alternative criteria proposed by McBain and Trush and Trout Unlimited (MTTU 2000), and "DS 3" identifies alternative criteria proposed in 2006 scoping comments by a team of consulting engineers and a law firm (Consulting Engineers 2006).

Table 5-1. Alternative Diversion Season Element Criteria

DIVERSION SEASON (DS) ALTERNATIVES	DESCRIPTION
DS1 (CDFG-NMFS 2002)	12/15–3/31
DS2 (MTTU 2000)	Year Round
DS3 (Consulting Engineers 2006 Scoping Comments)	10/1–3/31

5.4.2 Minimum Bypass Flow Alternatives

Four minimum bypass flow element (MBF) alternatives were identified and assessed. They are listed below in table 5-2. "MBF 1" is used to identify the CDFG-NMFS Draft Guidelines, "MBF 2" is used to identify alternative criteria proposed by MTTU 2000, and "MBF3" and "MBF4" are alternative criteria developed by R2 Resource Consultants (R2 Resource Consultants 2007).

Table 5-2. Alternative Minimum Bypass Flow Element Criteria

MINIMUM BYPASS FLOW (MBF) ALTERNATIVES	DESCRIPTION
MBF1 (CDFG-NMFS 2002)	February median daily flow
MBF2 (MTTU 2000)	10% exceedance flow

Table 5-2. Alternative Minimum Bypass Flow Element Criteria

MINIMUM BYPASS FLOW (MBF) ALTERNATIVES	DESCRIPTION
MBF3 (Upper MBF)	Varies with drainage area and mean annual flow, protective of best spawning habitat conditions in all streams: Drainage Area (DA[1]) < 290 mi^2: $Q_{MBF} = 8.7\ Q_m\ (DA)^{-0.47}$ Drainage Area > 290 mi^2: $Q_{MBF} = 0.6\ Q_m$ Q_m = unimpaired mean annual flow (cfs); for streams above anadromous habitat, DA is determined at the upstream limit of anadromy
MBF4 (Lower MBF)	Varies with drainage area and mean annual flow; lowest possible limit of protectiveness: Drainage Area < 0.11 mi^2: $Q_{MBF} = 8.7\ Q_m\ (DA)^{-0.47}$ Drainage Area = 0.11-500 mi^2: $Q_{MBF} = 5.1\ Q_m\ (DA)^{-0.71}$ Drainage Area ≥ 500 mi^2: $Q_{MBF} = 0.06\ Q_m$ For streams above anadromous habitat, DA is determined at the upstream limit of anadromy

5.4.3 Maximum Cumulative Diversion Alternatives

Four maximum cumulative diversion (MCD) element alternatives were identified and assessed. They are listed and described below in table 5-3. “MCD 1”, “MCD 2” and “MCD 3”are used to identify criteria recommended by the CDFG-NMFS Draft Guidelines, and “MCD 4” identifies alternative criteria proposed by MTTU (2000).

Table 5-3. Alternative Maximum Cumulative Diversion Element Criteria

MAXIMUM CUMULATIVE DIVERSION (MCD) ALTERNATIVES	DESCRIPTION
MCD1 (DFG-NMFS 2002)	MCD Rate = 15% of 20% winter (12/15-3/31) exceedance flow
MCD2 (DFG-NMFS 2002)	MCD Rate = 5% of 1.5 year flood peak flow
MCD3 (DFG-NMFS 2002)	MCD Volume = CFII = 10% of estimated unimpaired runoff (no restriction on diversion rate)
MCD4 (MTTU 2000)	MCD Rate = calculated from site-specific hydrograph for a reduction in duration of MBF rate by ½ day during 1.5 year event

5.4.4 Alternatives in Permitting of Onstream Dams

Alternatives to the CDFG-NFMS (2002) Draft Guidelines essentially consisted of potential modifications to the CDFG-NFMS (2002) alternative that would result in providing higher levels of protection for anadromous salmonids. The alternatives considered are listed in table 5-4. Stream classifications in the table were derived from the California Department of Forestry and Fire Protection (CDF) stream classification system (see section 2.4.4).

Table 5-4. Policy Alternatives for Permitting Requirements for Onstream Dams

<table>
<tr><th>STREAM CLASS</th><th>ALTERNATIVE</th></tr>
<tr><td rowspan="2">Class I</td><td>DP1.1
Onstream dams may not be issued water right permits.</td></tr>
<tr><td>DP1.2
New onstream dams may not be issued water right permits. A water right permit may be considered for an existing, unauthorized onstream dam that was built prior to 7/19/2006 if the following criteria are met:
▪ Fish passage and screening is provided;
▪ A passive bypass system is provided to bypass the minimum instream flow requirements;
▪ An exotic species eradication plan is implemented;
▪ A gravel and wood augmentation plan or bypass system is implemented; and
▪ Disturbed riparian habitat will be mitigated.</td></tr>
<tr><td rowspan="3">Class II</td><td>DP2.1
Onstream dams may not be issued water right permits.</td></tr>
<tr><td>DP2.2
New onstream dams may not be issued water right permits. A water right permit may be considered for an existing, unauthorized onstream dam that was built prior to 7/19/2006 if the following criteria are met:
▪ A passive bypass system is provided to bypass the minimum instream flow requirements;
▪ An exotic species eradication plan is implemented;
▪ A gravel and wood augmentation plan or bypass system is implemented; and
▪ Disturbed riparian habitat will be mitigated.</td></tr>
<tr><td>DP2.3
A water right permit may be considered for an onstream dam if the following criteria</td></tr>
</table>

Table 5-4. Policy Alternatives for Permitting Requirements for Onstream Dams

STREAM CLASS	ALTERNATIVE
	are met: ▪ A passive bypass system is used to bypass the minimum instream flow requirements; ▪ An exotic species eradication plan is implemented; ▪ A gravel and wood augmentation plan or bypass system is implemented; and ▪ Disturbed riparian habitat will be mitigated.
Class III	DP3.1 A water right permit may be considered for an onstream dam if the following criteria are met: ▪ The onstream dam will not dewater a Class II stream; and ▪ The onstream dam will cause less than 10% cumulative instantaneous impairment at locations where fish are seasonally present.
	DP3.2 A water right permit may be considered for an onstream dam if the following criteria are met: ▪ A passive bypass system is used to bypass the minimum instream flow requirements; ▪ An exotic species eradication plan is implemented; and ▪ A gravel and wood augmentation plan or bypass system is implemented.
	DP3.3 ▪ A water right permit may be considered for an onstream dam.

6 ASSESSMENT OF ENVIRONMENTAL IMPACTS

6.1 Approach to This Assessment

The State Water Board has prepared this substitute environmental document to assess the potential environmental effects of adopting and implementing the proposed Policy for maintaining instream flows in North Coast streams for the purposes of water right administration. The Policy itself will not approve any particular water diversion projects. Thus, the assessment of the project's potential environmental impacts is necessarily conducted at a programmatic level. Specific water right projects will be assessed on a project-level basis under CEQA.

Many of the potential significant environmental impacts identified herein will be subject to further analysis under CEQA when actions are taken in response to the Policy. If future project-level environmental reviews identify significant environmental effects, the lead agency must either mitigate those effects to less-than-significant levels or adopt a statement of overriding considerations that provides reasons for approving the project despite the potential for significant environmental impacts.

In general, the Policy will operate to protect the environment by ensuring that water rights are administered in a manner designed to maintain instream flows. Adoption and implementation of the Policy has no direct effects on the environment; all the environmental effects are indirect effects. As used in this document, an indirect physical change in the environment is a physical change which is not immediately related to adoption of the Policy, but which may occur as a result of the Policy being adopted and implemented.

For instance, the Policy may result in increased construction of offstream seasonal storage water supply reservoirs. Development of these reservoirs may result in environmental impacts, such as construction-related impacts, impacts due to the inundation of land under the reservoir, and operational impacts that result from the diversion of water from the stream. To the extent that those impacts can be anticipated, they are disclosed in this document. Similarly, those who wish to divert water but do not desire to or cannot comply with the guiding principles of the Policy may seek to acquire water by other means, such as through a contract with an existing water right holder, through diversion of surface water under a claim of riparian right, or by pumping groundwater. These actions can result in environmental changes that are indirect effects of Policy adoption. To the extent those effects can be anticipated and disclosed, the State Water Board has done so.

6.1.1 Actions Taken by Affected Persons

The proposed Policy requires certain measures that may lead affected persons to take actions that could result in indirect environmental impacts. Adoption of the Policy can result in two types of indirect impacts to the environment: (1) impacts that may occur as a result of complying with the Policy, and (2) impacts that may occur as a result of attempting to avoid the requirements of the Policy. Some of the actions that affected persons may take to comply with the Policy are the same as actions that may be taken to avoid the Policy.

For example, an unauthorized diverter could choose to remove an existing onstream reservoir and not divert water instead of attempting to obtain a water right. Another unauthorized diverter may choose to remove an existing onstream dam and build an offstream reservoir in order to obtain a water right. In both examples, the affected persons could choose to take actions that would result in the removal of an onstream dam, even though one person chooses to avoid the requirements of the Policy and the other person chooses to comply with it. It is impossible to predict which persons will take which of these actions, when or where the actions may occur, or precisely how many persons will take which of these actions. Accordingly, this impact assessment was conducted by defining categories of actions that affected persons may take in response to implementation of the adopted Policy.

The actions that affected persons may take in order to comply with the Policy include:

- removing or modifying onstream storage and regulatory dams,[38] and
- constructing new and expanding existing offstream storage facilities.

The actions that affected persons may take in order to avoid complying with the Policy include:

- removing or modifying onstream storage and regulatory dams,
- increasing groundwater extraction and use,
- increasing diversions under claim of riparian rights,
- relying on other alternative water sources and water conservation, and
- constructing new and expanding existing offstream storage facilities.

The Policy requires that instream flows be maintained. This requirement can restrict the amount of water potentially available for other beneficial uses, such as municipal, industrial, and agricultural uses. As part of the development of the proposed Policy, the State Water Board directed the preparation of certain analytical background documents that identified reasonably foreseeable indirect impacts of the Policy, including potential water supply effects and the potential indirect environmental impacts related to the modification or removal of existing, but unauthorized, impoundments on coastal streams within the Policy Area. These analyses are contained in two reports that are appended to this document:

- Appendix D, "North Coast Instream Policy – Restrictions on Flow Diversions and Storage – Potential Indirect Impacts on Municipal, Industrial and Agricultural Water Use and Related Indirect Impacts on Other Environmental Resources (Stetson Engineers 2007a);" and
- Appendix E, "North Coast Instream Policy – Potential Indirect Environmental Impacts of Modification or Removal of Existing Unauthorized Dams (Stetson Engineers 2007b)."

[38] A regulatory dam does not store water seasonally, but instead regulates the flow of water to make direct diversion of water possible.

6.2 Effects of Increased Groundwater Extraction and Use

6.2.1 How Implementation of the Policy May Give Rise to This Result

The proposed Policy's requirements for appropriations of surface water could lead some affected persons to obtain water supplies under other bases of right, including from sources other than surface water bodies (i.e., "alternative water sources"). Additionally, diverters may choose to obtain water supply from other sources if the application of the Policy requirements to a particular water right application reveals that there is insufficient surface water to supply the applicant. Five alternative sources of water, including increasing extraction of groundwater, are identified in appendix D, Potential Indirect Impacts on Municipal, Industrial and Agricultural Water Use and Related Indirect Impacts on Other Environmental Resources (Stetson Engineers 2007a). To provide an indication of the distribution of municipal water uses, figure 6-1 shows water districts and large water purveyors in the Policy Area.

6.2.2 Issues and Potential Effects

Groundwater basins within the Policy Area are defined in California Department of Water Resources Bulletin 118 (DWR 2003) (figure 4-2 of this document and figure A.4 of appendix D). As used in this substitute document, the term groundwater refers to underground water that is not subject to the water right permitting authority of the State Water Board. Other groundwater resources are present, but these regions have not been defined as basins by DWR and the extent and reliability of any such supplies are uncertain.

Estimates of future diversion demands and the maximum potential increase in groundwater pumping are provided in appendix D. Future requests to appropriate water in pending or new water right applications were estimated for each diverter group and county in the technical report in appendix D (table 16), as summarized in table 6-1, Future Diversion Demand.

Table 6-1. Future Diversion Demand (AF/year)

DIVERTER GROUP	HUMBOLDT	MARIN	MENDOCINO	NAPA	SONOMA	TOTAL
Large water agencies	0	7,400	20,557	0	37,261	65,218
Small water agencies and self-supplied individuals	30	300	10,210	1,131	16,348	28,019
Total	**30**	**7,700**	**30,767**	**1,131**	**53,609**	**93,237**

Possible future demands sorted by groundwater basins were estimated as a range, as listed in table 6-2, Estimated Potential Future Groundwater Demands in the Policy Area (see also appendix D, table 17). The lower end of the range is the "planned usage from groundwater" and is computed as the sum of large water agencies' future groundwater demand as listed in their Urban Water Management Plans plus the estimated portion of the small water agencies and self-supplied individuals' future diversion demand that would be supplied from groundwater use. The upper end of the range is estimated as the lower end of the range plus all future diversion demands. This assumes that all future demands would be supplied from groundwater.

Table 6-2. Estimated Potential Future Groundwater Demands in the Policy Area

COUNTY	GROUNDWATER BASINS	FUTURE GROUNDWATER DEMANDS (AF/YEAR)		ADEQUACY (see note below)*
		LOWER	UPPER	
Humboldt	Honeydew Town Area, Mattole River Valley	30	60	Likely adequate to meet upper demand. Likely adequate for small agencies and self-supplied individuals provided site-specific hydrogeologic conditions are suitable.
Marin	Novato Valley, Ross Valley, San Rafael Valley, Sand Point Area, Wilson Grove Formation Highlands	230	7,930	Not likely adequate to meet upper demand due to limiting hydrogeologic factors. May be adequate to meet lower demand, particularly for small agencies and self-supplied individuals, provided site-specific hydrogeologic conditions are suitable.
Mendocino	Anapolis Ohlsen Ranch, Anderson Valley, Big River Valley, Cottoneva Creek Valley, Fort Bragg Terrace Area, Fort Ross Terrace Deposits, Garcia River Valley, Little Valley, McDowell Valley, Navarro River Valley, Potter Valley, Sanel Valley, Ten Mile River Valley, Ukiah Valley	2,830	33,600	Not likely adequate to meet upper demand due to limiting hydrogeologic factors. May be adequate to meet lower demand for large and small agencies and self-supplied individuals, provided site-specific hydrogeologic conditions are suitable.
Napa	Napa-Sonoma Valley	2,670	3,800	May be adequate to meet upper demand. May be adequate for small agencies and self-supplied individuals provided site-specific hydrogeologic conditions are suitable.
Sonoma	Alexander Valley, Anapolis Ohlsen Ranch, Bodega Bay Area, Fort Ross Terrace Deposits, Kenwood Valley, Knights Valley, Lower Russian River Valley, Napa-Sonoma Valley, Petaluma Valley, Santa Rosa Valley, Wilson Grove Formation Highlands	11,430	65,040	Not likely adequate to meet lower demand due to limiting hydrogeologic factors. May be adequate for small agencies and self-supplied individuals provided site-specific hydrogeologic conditions are suitable.

* The availability of groundwater that is not subject to the water right permitting authority of the State Water Board is unknown and subject to the determinations of the State Water Board. The adequacy of groundwater as an alternative supply source may be limited by future State Water Board determinations.

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Figure 6-1
Water Districts and Major Water Purveyors

The use of groundwater in the Policy Area is limited by hydrogeologic factors, including sea-water intrusion, thin alluvial deposits, aquifer materials of low permeability, and the quality of water. Sea-water intrusion has been identified in coastal aquifers of Napa, Sonoma, and Mendocino Counties. Overdraft, resulting from excessive pumping associated with development, could possibly occur in the future, reducing available supplies in late summer and dry years. In some site-specific cases, groundwater may be an adequate alternative supply source for low-capacity wells, such as those typically associated with small water agencies, and self-supplied individuals for domestic, industrial, or agricultural use. Groundwater is not a likely adequate alternative supply source for large agencies because of the above-described limiting hydrogeologic factors.

Appendix D identifies some of the potential environmental impacts that could result from increased extraction of groundwater. Possible impacts that might result from increases in groundwater extraction, including possible impacts identified in appendix D, are summarized in table 6-3, Possible Indirect Environmental Impacts Resulting from Increased Groundwater Extraction and Use by Water Diverters in Response to the Policy.

Table 6-3. Possible Indirect Environmental Impacts Resulting from Increased Groundwater Extraction and Use by Water Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Aesthetics	Construction activities could result in short-term disturbance of visual resources. Siting of infrastructure could result in long-term disturbance of visual resources.	Potentially significant depending on the characteristics of the specific action taken, particularly in public areas with highly scenic views, including but not limited to areas within or adjacent to the project area that are managed by the California Department of Parks and Recreation (i.e., “park units”).
Agriculture Resources	Increases in groundwater extraction could result in lowering of the groundwater table and reduction in water available to non-irrigated crops that rely on groundwater for soil moisture resulting in reduced crop yield.	Potentially significant depending on the characteristics of the specific action taken.
Air Quality	Construction activities could result in short-term contribution to PM10, ozone, nitrogen oxides, carbon monoxide or other pollutant levels. Operation of some pumps could result in long-term increased pollutant levels.	Potentially significant depending on the characteristics of the specific action taken.

Table 6-3. Possible Indirect Environmental Impacts Resulting from Increased Groundwater Extraction and Use by Water Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Biological Resources	Construction activities could result in disturbance of aquatic features (e.g., wetlands) regulated by the Army Corps of Engineers, Regional Water Quality Control Boards, Department of Fish and Game and California Coastal Commission; disturbance of special-status species and their habitats; disturbance of sensitive natural communities. Extraction of groundwater could result in reduced surface water flows, particularly summer flows, which could harm riparian vegetation or degrade habitat for sensitive species.	Potentially significant depending on the characteristics of the specific action taken.
Cultural Resources	Construction activities could result in disturbance of cultural resources. Siting of pumps and appurtenant infrastructure could impair the significance of historical resources.	Potentially significant depending on the characteristics of the specific action taken.
Geology/Soils	Construction activities could result in erosion or loss of topsoil during and immediately following construction.	Potentially significant depending on the characteristics of the specific action taken.
Hazards/Hazardous Materials	Increased groundwater extraction could result in increased use of hazardous materials associated with construction, operation, and maintenance of new or existing appurtenant facilities.	Potentially significant depending on the characteristics of the specific action taken.
Hydrology/Water Quality	Construction activities could result in short-term increases in sedimentation and degradation of water quality. Extraction of groundwater could result in reduced surface water flows, particularly summer flows, which could adversely affect water temperature and increase constituent concentrations due to reduced dilution. The production rates of nearby wells could drop.	Potentially significant depending on the characteristics of the specific action taken.
Land Use/Planning	Construction activities and siting of infrastructure could result in conflicts with land use plans, policies or regulations adopted for the purpose of avoiding or mitigating environmental effects by agencies with jurisdiction within the project area.	Potentially significant depending on the characteristics of the specific action taken.

Table 6-3. Possible Indirect Environmental Impacts Resulting from Increased Groundwater Extraction and Use by Water Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Mineral Resources	Increased groundwater extraction will not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State and will not result in the loss of locally important mineral resources recovery sites that are delineated on a local general plan, specific plan, or other land use plan.	Not significant.
Noise	Short-term increased noise from construction of new groundwater pumping facilities; long-term increased noise due to the operation of pumps.	Potentially significant depending on the characteristics of the specific action taken.
Population/Housing	Increased groundwater extraction will not result in substantial population growth, will not displace substantial numbers of people, and will not displace substantial numbers of existing housing units.	Not significant.
Public Services	Increased groundwater extraction will not affect public services.	Not significant.
Recreation	Extraction of groundwater could result in reduced surface water flows, particularly summer flows, which could adversely affect recreational opportunities.	Potentially significant depending on the characteristics of the specific action taken.
Transportation/Traffic	Construction activities could result in localized, short-term increases in traffic.	Potentially significant depending on the characteristics of the specific action taken.
Utilities/Service Systems	Construction activities could result in localized, short-term disruption of utility service. Reliance on groundwater could result in expansion of existing water and energy delivery systems.	Potentially significant depending on the characteristics of the specific application for water right.

6.3 Effects of Increased Diversions Under Claimed Riparian Rights

6.3.1 How Implementation of the Policy May Give Rise to This Result

The proposed Policy's requirements for appropriations of surface water could lead some affected persons to obtain water supplies from sources other than appropriative surface water rights (i.e., "alternative water sources"). Additionally, diverters may choose to obtain water supply from other sources if the application of the Policy requirements to a particular water right application reveals there is insufficient surface water to supply the applicant.

Five alternative sources of water, including reliance on water diverted and used under a riparian water right (i.e., an alternative basis of right), are identified in appendix D, Potential Indirect Impacts on Municipal, Industrial and Agricultural Water Use and Related Indirect Impacts on Other Environmental Resources (Stetson Engineers 2007a).

6.3.2 Issues and Potential Effects

Water that is diverted and used under a riparian right cannot be seasonally stored. Surface water use under a riparian right is naturally limited during the summer irrigation season by the availability of water during this low flow period. In some cases, water diverted under a riparian right may provide an adequate alternative supply for self-supplied individuals for domestic and industrial use, but riparian rights cannot practicably be used to supply large or small water agencies (because a riparian right can only be used on the smallest parcel of land that has maintained contiguity to a stream and because water diverted under a claim of riparian right cannot be used outside the watershed of the watercourse that supplies the use) or summer irrigators (because of low flows).

Estimates of the maximum potential increase in riparian water use are provided in appendix D, table 16. This water use was conservatively estimated to be equal to the estimated future diversion demand of small water agencies and self-supplied individuals, as summarized in table 6-4.

Table 6-4. Estimated Increase in Riparian Water Use (AF/year)

DIVERTER GROUP	WATER RIGHT PERMIT STATUS	COUNTY					TOTAL
		HUMBOLDT	MARIN	MENDOCINO	NAPA	SONOMA	
Small Water Agencies and Self-Supplied Individuals	Pending	0	5	10,210	1,131	16,348	27,694
	New	30	295	0	0	0	325
Future Diversion Demand (AF/year)		30	300	10,210	1,131	16,348	28,019

Appendix D identifies some of the potential environmental impacts that could result from reliance on water diverted and used under a riparian water right. Possible impacts that might result from reliance on water diverted and used under a riparian water right, including possible impacts identified in appendix D, are summarized in table 6-5.

Table 6-5. Possible Indirect Environmental Impacts Resulting from Increased Riparian Water Use by Water Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Aesthetics	Diversion and use of water under a riparian water right will not affect aesthetic resources.	Not significant.
Agriculture Resources	Diversion and use of water under a riparian water right will not affect agricultural resources.	Not significant.

Table 6-5. Possible Indirect Environmental Impacts Resulting from Increased Riparian Water Use by Water Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Air Quality	Operation of some pumps could result in long-term increased pollutant levels.	Potentially significant depending on the characteristics of the specific action taken
Biological Resources	Diversion and use of water under a riparian water right could result in reduced surface water flows, particularly summer flows, which could harm riparian vegetation or degrade habitat for sensitive species.	Potentially significant depending on the characteristics of the specific action taken.
Cultural Resources	Diversion and use of water under a riparian water right will not affect cultural resources.	Not significant.
Geology/Soils	Diversion and use of water under a riparian water right will not affect geology/soils.	Not significant.
Hazards/Hazardous Materials	Operation of some pumps could result in increased use of hazardous materials.	Not significant.
Hydrology/Water Quality	Diversion and use of water under a riparian water right could result in reduced surface water flows, particularly summer flows, which could adversely affect water temperature and increase constituent concentrations due to reduced dilution.	Potentially significant depending on the characteristics of the specific action taken.
Land Use/Planning	Diversion and use of water under a riparian water right will not result in conflicts with land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating environmental effects by agencies with jurisdiction within the project area.	Not significant.
Mineral Resources	Diversion and use of water under a riparian water right will not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State and will not result in the loss of locally important mineral resources recovery sites that are delineated on a local general plan, specific plan, or other land use plan.	Not significant.
Noise	Diversion and use of water under a riparian water right could result in long-term increased noise due to the operation of pumps.	Potentially significant depending on the characteristics of the specific action taken.

Table 6-5. Possible Indirect Environmental Impacts Resulting from Increased Riparian Water Use by Water Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Population/Housing	Diversion and use of water under a riparian water right will not result in substantial population growth, will not displace substantial numbers of people, and will not displace substantial numbers of existing housing units.	Not significant.
Public Services	Diversion and use of water under a riparian water right will not affect public services.	Not significant.
Recreation	Diversion and use of water under a riparian water right could result in reduced surface water flows, particularly summer flows, which could adversely affect recreational opportunities.	Potentially significant depending on the characteristics of the specific action taken.
Transportation/Traffic	Diversion and use of water under a riparian water right will not affect transportation and traffic.	Not significant.
Utilities/Service Systems	Diversion and use of water under a riparian water right will not affect utilities and service systems.	Not significant.

6.4 Effects of Reliance on Other Alternative Water Supplies and Sources

6.4.1 How Implementation of the Policy May Give Rise to This Result

The proposed Policy's requirements for appropriations of surface water could lead some water right applicants to obtain water supplies from sources other than appropriative surface water rights (i.e., "alternative water sources"). Additionally, diverters may choose to obtain water supply from other sources if the application of the Policy requirements to a particular water right application reveals there is insufficient surface water to supply the applicant.

Five alternative sources of water, including use of imported water, desalinated water, and recycled water, are identified in appendix D, Potential Indirect Impacts on Municipal, Industrial and Agricultural Water Use and Related Indirect Impacts on Other Environmental Resources (Stetson Engineers 2007a). In addition to alternative sources of water, appendix D identifies water conservation as a response to the Policy that might be taken by potential water right applicants.

6.4.2 Issues and Potential Effects

Estimates of the maximum potential use of imported water, desalinated water, and recycled water as alternative water supply sources, and of reductions in demand through conservation, are presented in table 6-6, Future Alternative Water Source and Water Conservation Demand (see also appendix D, table 18). These estimates assume that the entire future diversion demand could not be satisfied from surface water or groundwater and would be satisfied by each alternative source, if possible.

Table 6-6. Future Alternative Water Source and Water Conservation Demand

COUNTY	ALTERNATIVE WATER SOURCE	FUTURE ALTERNATIVE WATER SOURCE DEMAND (AF/YEAR)
Humboldt	Not applicable	
Marin	Water conservation	7,700
	Increased development of recycled water and desalination	7,400
Mendocino	Water conservation	30,767
	Development of recycled water and desalination	20,557
Napa	Development of imported water	1,131
Sonoma	Water conservation	56,309
	Development of recycled water and desalination	30,725

If alternative water sources are inadequate to meet the future requirements of water users, some increment of projected future demand within the Policy Area may need to be reduced or eliminated through increased reliance on water conservation, or by changing projections of future development or other land uses that require water.

Appendix D identifies some of the potential environmental impacts that could result from use of imported water, desalinated water, and recycled water, and from reliance on water conservation as alternative sources of water. Possible impacts that might result from reliance on these alternatives, including possible impacts identified in appendix D, are summarized in table 6-7.

Table 6-7. Possible Indirect Environmental Impacts Resulting from Increased Reliance on Other Alternative Sources by Water Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Aesthetics	Construction activities could result in short-term disturbances of visual resources; siting of infrastructure could result in long-term change in visual character or quality.	Potentially significant depending on the characteristics of the specific action taken.

Table 6-7. Possible Indirect Environmental Impacts Resulting from Increased Reliance on Other Alternative Sources by Water Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Agriculture Resources	Implementation of water conservation could result in modifications to cropping patterns and conversion of farmland to less water-consumptive use.	Potentially significant depending on the characteristics of the specific action taken.
Air Quality	Construction activities could result in short-term contribution to PM10, ozone, nitrogen oxides, carbon monoxide, or other pollutant levels.	Potentially significant depending on the characteristics of the specific action taken.
Biological Resources	Construction, operation, and maintenance of infrastructure could result in disturbance of aquatic features (e.g., wetlands) regulated by the Army Corps of Engineers, Regional Water Quality Control Boards, Department of Fish and Game, and California Coastal Commission; could disturb special-status species and their habitats; and could disturb sensitive natural communities.	Potentially significant depending on the characteristics of the specific action taken.
Cultural Resources	Construction activities could disturb cultural resources. Siting of infrastructure could impair the significance of historical resources.	Potentially significant depending on the characteristics of the specific action taken.
Geology/Soils	Erosion or loss of topsoil during and immediately following construction activities could occur; infrastructure could result in exposure of people or structures to potential fault rupture, seismic ground shaking, landslide, or other geologic hazard.	Potentially significant depending on the characteristics of the specific action taken.
Hazards/Hazardous Materials	Construction, operation and maintenance of infrastructure could result in increased use of hazardous materials.	Potentially significant depending on the characteristics of the specific action taken.
Hydrology/Water Quality	Construction, operation, and maintenance activities could result in increases in sedimentation and degradation of water quality; use of desalinated and recycled water and increased water conservation could contribute to salt loadings in the Policy Area.	Potentially significant depending on the characteristics of the specific action taken.
Land Use/Planning	Implementation of water conservation could reduce projections of future development of lands for urban or agricultural uses.	Potentially significant depending on the characteristics of the specific action taken.

Table 6-7. Possible Indirect Environmental Impacts Resulting from Increased Reliance on Other Alternative Sources by Water Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Mineral Resources	Construction activities will not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State and will not result in the loss of locally important mineral resources recovery sites that are delineated on a local general plan, specific plan, or other land use plan.	Not significant.
Noise	Construction, operation and maintenance activities could result in increases in noise.	Potentially significant depending on the characteristics of the specific action taken.
Population/Housing	Construction, operation, and maintenance activities, and implementation of water conservation will not result in substantial population growth, will not displace substantial numbers of people, and will not displace substantial numbers of existing housing units.	Potentially significant depending on the characteristics of the specific action taken.
Public Services	Construction, operation, and maintenance of new or altered facilities needed to provide acceptable levels of public services (i.e., desalination, wastewater treatment, conveyance facilities) could cause significant environmental impacts.	Potentially significant depending on the characteristics of the specific action taken.
Recreation	Construction, operation, and maintenance of new or altered facilities and implementation of water conservation will not affect recreational opportunities.	Not significant.
Transportation/Traffic	Construction activities could result in localized, short-term increases in traffic.	Potentially significant depending on the characteristics of the specific action taken.
Utilities/Service Systems	Use of imported water, desalinated water, and recycled water as alternative water supply sources, and of reductions in demand through conservation, could require construction or expansion of infrastructure; construction activities could result in localized, short-term disruption of utility service and significant environmental effects.	Potentially significant depending on the characteristics of the specific application for water right.

6.5 Effects of Changes in Onstream Water Storage and Regulatory Dams

6.5.1 How Implementation of the Policy May Give Rise to This Result

Dam owners may have to modify existing unauthorized dams to comply with the elements of the Policy pertaining to permitting requirements for onstream dams. Existing unauthorized dams may have to be removed. For these reasons, implementation of the proposed Policy could result in some affected persons modifying or removing onstream storage and regulatory dams and their appurtenant reservoirs.

6.5.2 Issues and Potential Effects

Implementation of the Policy may require affected persons to modify existing onstream dams to install fish ladders, fish screens, and passive bypass systems. In general, the foreseeable, indirect environmental consequences of these dam modifications would likely be beneficial in terms of anadromous fish passage and habitat, and adverse with respect to construction-related effects that may cause short-term impacts on aesthetic, water, and biological resources and short-term noise-related impacts.

A potentially larger issue pertains to the possible removal of existing, unauthorized onstream dams. To what extent and in what locations removal of unauthorized dams may occur, either voluntarily or as a possible result of enforcement action, cannot be predicted. The general effects of dam removal, however, are becoming increasingly well known. Removal of onstream dams is associated with a wide array of indirect effects on the environment. Depending on the location of the dam, affected resource, and the nature of the impact, the effect could be beneficial or adverse, short-term or long-term. Site-specific conditions can be important in weighing the impacts and benefits (American Rivers and Trout Unlimited 2002). Recognizing the importance of these potential effects, the State Water Board conducted a study of the "Potential Indirect Environmental Impacts of Modification or Removal of Unauthorized Dams" (Stetson Engineers 2007b). This report is attached as appendix E.

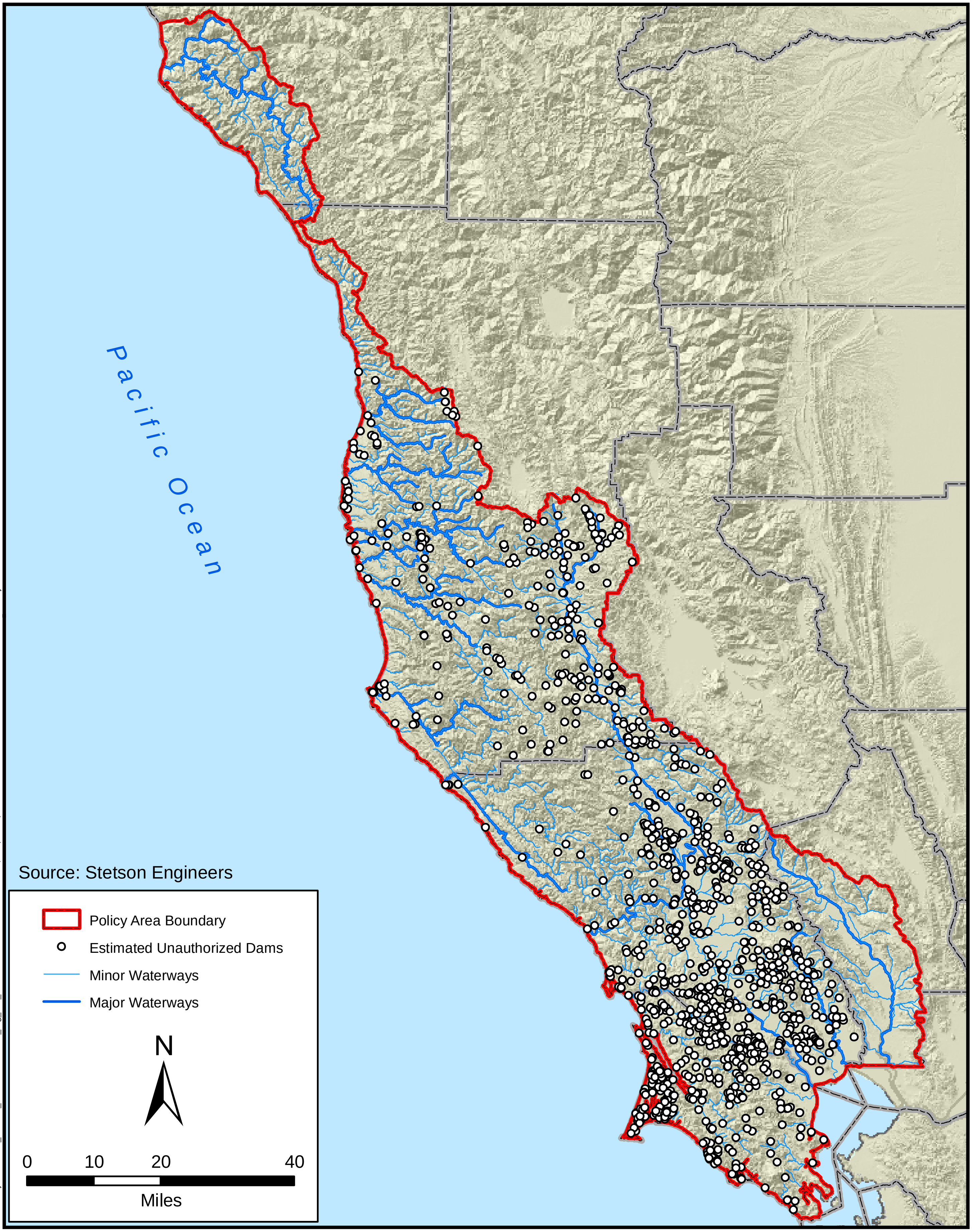
Dam removal can have beneficial ecological effects in terms of returning the stream to a more natural hydrograph, temperature regime, dissolved oxygen content, and sediment transport system. It can promote the rehabilitation of native species including fish; biodiversity and the population densities of native aquatic organisms increase when dams are removed. The removal of a dam may provide new upstream habitat to anadromous fish if they were unable to pass the structure previously. It can reduce predation of endangered anadromous fish that get caught in pools below dams. Removal of dams returns the natural flow of rivers, which benefits the life cycles of many aquatic organisms. Frequent and more natural flooding resulting from dam removal may promote wetland and riparian growth along river edges.

Dam removal can also cause potentially significant adverse effects. While some of these effects, such as the increase in turbidity after dam removal, are relatively short-lived, other effects are not. The loss of impounded water behind dams, for example, would reduce the available habitat used by special-status species such as the western pond turtle and red-legged frog. Dewatering of an impoundment behind a dam after dam removal can result in loss of wetlands. Heavy metals, dissolved nutrients, toxicants attached to sediment particles, and other contaminants trapped in the sediments stored behind dams can, when released, cause adverse effects to downstream organisms and water quality, depending on the type and quantity of the contaminant. Among a number of effects to the human environment, dams create impoundments for use in agriculture and recreation, and dam removal would reduce the availability of water for those uses (American Rivers 2002, American Rivers and Trout Unlimited 2002, ICF Consulting 2005, NSR 2000, Stetson Engineers 2007b).

Estimates of the numbers and onstream storage volume and surface area of existing unauthorized dams that might be affected by the Policy are provided in appendix E, North Coast Instream Flow Policy – Potential Indirect Environmental Impacts of Modification or Removal of Existing Unauthorized Dams (Stetson Engineers 2007b). These estimates are summarized in table 6-8. Figure 6-2 shows the approximate number and locations of estimated unauthorized dams.

Table 6-8. Summary of Estimated, Existing Unauthorized Dams

ESTIMATED STREAM CLASS	COUNTY					TOTAL
	HUMBOLDT	MARIN	MENDOCINO	NAPA	SONOMA	
Number of Existing Unauthorized Regulatory Dams						
	0	0	109	9	84	202
Number of Existing Unauthorized Impoundment Dams						
	0	180	387	301	701	1,569
Total Number of Existing Unauthorized Dams						
	0	180	496	310	785	1,771
Onstream Storage Volume (AF)						
	0	18,033	7,513	10,778	22,150	58,474
Onstream Water Surface Area (acres)						
	0	1,202	501	719	1,477	3,898



Path: \Projects\50756_Stream_Inflow\GIS\50756_Fig_6-2_UnauthDams.mxd Source: NSR, Inc.; ESRI; Stetson Created: 10-01-07 Revised: 12-13-07 rjo/cshoemaker

Figure 6-2
Estimated Unauthorized Dams

Additionally, appendix E identifies some of the potential impacts that might result from modification or removal of existing unauthorized dams. Possible impacts that might result from modification of existing dams, including possible impacts identified in appendix E, are summarized in table 6-9, Possible Indirect Environmental Impacts of Resulting from Modification of Onstream Dams in Response to the Policy. Similarly, possible impacts that might result from removal of existing dams, including possible impacts identified in appendix E, are summarized in table 6-10, Possible Indirect Environmental Impacts Resulting from Removal of Onstream Dams in Response to the Policy.

Table 6-9. Possible Indirect Environmental Impacts Resulting from Modification of Onstream Dams by Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Aesthetics	Construction activities could result in short-term disturbances of visual resources	Potentially significant depending on the characteristics of the specific application for water right.
Agriculture Resources	Modification of some dams could result in reductions of reservoir storage capacity available for agricultural use, and could result in conversion of farmland to non-agricultural use.	Potentially significant depending on the characteristics of the specific application for water right.
Air Quality	Construction activities could result in short-term contribution to PM10, ozone, nitrogen oxides, carbon monoxide or other pollutant levels.	Potentially significant depending on the characteristics of the specific application for water right.
Biological Resources	Construction activities could result in disturbance of aquatic features (e.g., wetlands) regulated by the Army Corps of Engineers, Regional Water Quality Control Boards, Department of Fish and Game and California Coastal Commission; disturbance of special-status species and their habitats; disturbance of sensitive natural communities.	Potentially significant depending on the characteristics of the specific application for water right.
Cultural Resources	Construction activities could result in disturbance of cultural resources.	Potentially significant depending on the characteristics of the specific application for water right.
Geology/Soils	Modification of dams could result in exposure of people or structures to potential fault rupture, seismic ground shaking, landslide, or other geologic hazard; and erosion or loss of topsoil during and immediately following construction.	Potentially significant depending on the characteristics of the specific application for water right.

Table 6-9. Possible Indirect Environmental Impacts Resulting from Modification of Onstream Dams by Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Hazards/Hazardous Materials	Modification of dams could result in increased use of hazardous materials associated with construction, operation, and maintenance of new appurtenant facilities.	Not significant.
Hydrology/Water Quality	Construction activities could result in short-term increases in sedimentation and degradation of water quality.	Potentially significant depending on the characteristics of the specific application for water right.
Land Use and Planning	Construction activities could result in conflicts with land use plans, policies or regulations adopted for the purpose of avoiding or mitigating environmental effects by agencies with jurisdiction within the project area.	Not significant.
Mineral Resources	Construction activities will not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State and will not result in the loss of locally important mineral resources recovery sites that are delineated on a local general plan, specific plan, or other land use plan.	Not significant.
Noise	Construction activities could result in short-term increases in noise.	Not significant.
Population/Housing	Construction activities will not result in substantial population growth, will not displace substantial numbers of people, and will not displace substantial numbers of existing housing units.	Not significant
Public Services	Modification of some dams could result in reductions of reservoir storage capacity available for fire protection.	Not significant
Recreation	Modification of some dams could result in reductions of reservoir storage capacity available for recreational use.	Not significant.
Transportation/Traffic	Construction activities could result in localized, short-term increases in traffic.	Not significant.

Table 6-9. Possible Indirect Environmental Impacts Resulting from Modification of Onstream Dams by Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Utilities/ Service Systems	Construction activities could result in localized, short-term disruption of utility service. Modification of some dams could result in reductions of reservoir storage capacity available for domestic, industrial, and municipal use and for stormwater attenuation, and could result in expansion of existing facilities or construction of new facilities.	Potentially significant depending on the characteristics of the specific application for water right.

Table 6-10. Possible Indirect Environmental Impacts Resulting from Removal of Onstream Dams by Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Aesthetics	Construction activities could result in short-term disturbances to visual resources; relocation or elimination of onstream storage could result in long-term change in visual character or quality.	Potentially significant depending on the characteristics of the specific application for water right, particularly in public areas with highly scenic views including but not limited to areas within or adjacent to the project area that are managed by the California Department of Parks and Recreation (i.e., "park units").
Agriculture Resources	Relocation or elimination of onstream storage could result in reductions in reservoir storage capacity available for agricultural use, and could result in conversion of farmland to non-agricultural use.	Potentially significant depending on the characteristics of the specific application for water right.
Air Quality	Construction activities could result in short-term contribution to PM10, ozone, nitrogen oxides, carbon monoxide or other pollutant levels.	Potentially significant depending on the characteristics of the specific application for water right.

Table 6-10. Possible Indirect Environmental Impacts Resulting from Removal of Onstream Dams by Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Biological Resources	Relocation or elimination of onstream storage could result in disturbance of aquatic features (e.g., wetlands) regulated by the Army Corps of Engineers, Regional Water Quality Control Boards, Department of Fish and Game and California Coastal Commission; could disturb special-status species and their habitats; and could disturb sensitive natural communities.	Potentially significant depending on the characteristics of the specific application for water right.
Cultural Resources	Construction activities could disturb cultural resources.	Potentially significant depending on the characteristics of the specific application for water right.
Geology/Soils	Erosion or loss of topsoil during and immediately following construction activities could occur.	Potentially significant depending on the characteristics of the specific application for water right.
Hazards/Hazardous Materials	Construction activities could result in increased use of hazardous materials.	Potentially significant depending on the characteristics of the specific application for water right.
Hydrology/Water Quality	Construction activities could result in short-term increases in sedimentation and degradation of water quality; changes in channel processes and release of sediment following dam removal; and reduction in detention of storm flows and increased potential flooding.	Potentially significant depending on the characteristics of the specific application for water right.
Land Use/Planning	Construction activities and relocation or elimination of onstream storage could conflict with land use plans, policies or regulations adopted for the purpose of avoiding or mitigating environmental effects by agencies with jurisdiction within the project area.	Potentially significant depending on the characteristics of the specific application for water right.
Mineral Resources	Construction activities and relocation or elimination of onstream storage will not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State and will not result in the loss of locally-important mineral resources recovery sites that are delineated on a local general plan, specific plan, or other land use plan	Not significant.

Table 6-10. Possible Indirect Environmental Impacts Resulting from Removal of Onstream Dams by Diverters in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Noise	Construction activities could result in short-term increases in noise.	Potentially significant depending on the characteristics of the specific application for water right.
Population/Housing	Construction activities and relocation or elimination of onstream storage will not result in substantial population growth, will not displace substantial numbers of people, and will not displace substantial numbers of existing housing units.	Not significant.
Public Services	Relocation or elimination of onstream storage could result in reductions of reservoir storage capacity available for fire protection.	Not significant
Recreation	Relocation or elimination of onstream storage could result in a loss of recreational opportunities.	Potentially significant depending on the characteristics of the specific application for water right.
Transportation/Traffic	Construction activities could result in localized, short-term increases in traffic.	Not significant.
Utilities/Service Systems	Construction activities could result in localized, short-term disruption of utility service. Relocation or elimination of onstream storage could result in reductions in reservoir storage capacity available for domestic, industrial, and municipal use and for stormwater attenuation, and could result in expansion of existing facilities or construction of new facilities.	Potentially significant depending on the characteristics of the specific application for water right.

6.6 Construction of New and Expansion of Existing Offstream Storage

6.6.1 How Implementation of the Policy May Give Rise to This Result

Due to Policy requirements limiting construction of new onstream dams, future applicants for water rights who need storage may choose to construct new offstream storage. Also, owners of existing unauthorized onstream dams may have to remove their dams and may choose to construct new offstream storage to replace the removed onstream storage. These actions by dam owners could give rise to indirect environmental impacts.

6.6.2 Issues and Potential Effects

Estimates of the numbers and onstream storage volume and surface area of potential unauthorized dams that might be affected by the proposed Policy are provided in appendix E, North Coast Instream Flow Policy – Potential Indirect Environmental Impacts of Modification or Removal of Potential Unauthorized Dams (Stetson Engineers 2007b). These estimates involve some uncertainty concerning whether the dams actually exist or, if they do exist, whether they require an appropriative water right. These estimates are summarized in table 6-8, Summary of Estimated, Existing Unauthorized Dams, which is presented in section 6.5. The maximum potential number and storage volume of new offstream storage facilities are estimated to be equal to the estimated number and storage volume of potential unauthorized offstream storage facilities identified in table 6-8.

Additionally, appendix E identifies some of the potential impacts that might result from relocating onstream storage capacity to new or expanded offstream storage facilities. Possible impacts that might result from relocating onstream storage capacity to new or expanded offstream storage facilities, including possible impacts identified in appendix E, are summarized in table 6-11, Possible Indirect Environmental Impacts Resulting from Diverters' Relocation of Onstream Storage Capacity to Offstream Locations in Response to the Policy.

Table 6-11. Possible Indirect Environmental Impacts Resulting from Diverters' Relocation of Onstream Storage Capacity to Offstream Locations in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Aesthetics	Construction activities could result in short-term disturbances to visual resources; relocation to offstream storage could result in long-term change in visual character or quality.	Potentially significant depending on the characteristics of the specific application for water right, particularly in public areas with highly scenic views including but not limited to areas within or adjacent to the project area that are managed by the California Department of Parks and Recreation (i.e., "park units").
Agriculture Resources	Relocation of storage could result in reductions in reservoir storage capacity available for agricultural use, and could result in conversion of farmland to non-agricultural use due to the reduction of storage or inundation of agricultural land.	Potentially significant depending on the characteristics of the specific application for water right.
Air Quality	Construction activities could result in short-term contribution to PM10, ozone, nitrogen oxides, carbon monoxide or other pollutant levels.	Potentially significant depending on the characteristics of the specific application for water right.

Table 6-11. Possible Indirect Environmental Impacts Resulting from Diverters' Relocation of Onstream Storage Capacity to Offstream Locations in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Biological Resources	Relocation of storage could result in disturbance of aquatic features (e.g., wetlands) regulated by the Army Corps of Engineers, Regional Water Quality Control Boards, Department of Fish and Game and California Coastal Commission; could disturb special-status species and their habitats; and could disturb sensitive natural communities.	Potentially significant depending on the characteristics of the specific application for water right.
Cultural Resources	Construction activities could disturb cultural resources. Relocation of onstream storage could impair the significance of historical resources.	Potentially significant depending on the characteristics of the specific application for water right.
Geology/Soils	Erosion or loss of topsoil during and immediately following construction activities could occur. Relocation of onstream storage could result in exposure of people or structures to potential fault rupture, seismic ground shaking, landslide, or other geologic hazard.	Potentially significant depending on the characteristics of the specific application for water right.
Hazards/Hazardous Materials	Construction activities could result in increased use of hazardous materials.	Potentially significant depending on the characteristics of the specific application for water right.
Hydrology/Water Quality	Construction activities could result in short-term increases in sedimentation and degradation of water quality. Relocation of onstream storage could result in reduced detention of storm flows and increased potential flooding.	Potentially significant depending on the characteristics of the specific application for water right.
Land Use/Planning	Construction activities and relocation of onstream storage could conflict with land use plans, policies or regulations adopted for the purpose of avoiding or mitigating environmental effects by agencies with jurisdiction within the project area.	Potentially significant depending on the characteristics of the specific application for water right.

Table 6-11. Possible Indirect Environmental Impacts Resulting from Diverters' Relocation of Onstream Storage Capacity to Offstream Locations in Response to the Policy

ENVIRONMENTAL ISSUE AREA	POSSIBLE INDIRECT ENVIRONMENTAL IMPACT	SIGNIFICANCE OF IMPACTS
Mineral Resources	Construction activities and relocation of onstream storage could result in the loss of availability of a mineral resource that could be of value to the region and the residents of the State and could result in the loss of locally-important mineral resources recovery sites that may be delineated on a local general plan, specific plan, or other land use plan.	Potentially significant depending on the characteristics of the specific application for water right.
Noise	Construction activities could result in short-term increases in noise.	Potentially significant depending on the characteristics of the specific application for water right.
Population/Housing	Construction activities and relocation of onstream storage will not result in substantial population growth, will not displace substantial numbers of people, and will not displace substantial numbers of existing housing units.	Not significant.
Public Services	Relocation of onstream storage could result in reductions in reservoir storage capacity available for fire protection.	Potentially significant depending on the characteristics of the specific application for water right.
Recreation	Relocation of onstream storage could result in a loss of recreational opportunities.	Potentially significant depending on the characteristics of the specific application for water right.
Transportation/Traffic	Construction activities could result in localized, short-term increases in traffic.	Potentially significant depending on the characteristics of the specific application for water right.
Utilities/Service Systems	Construction activities could result in localized, short-term disruption of utility service. Relocation of onstream storage could result in reductions in reservoir storage capacity available for domestic, industrial, and municipal use and for stormwater attenuation, and could result in expansion of existing facilities or construction of new facilities.	Potentially significant depending on the characteristics of the specific application for water right.

6.7 Actions Taken in Compliance with Flow-related Policy Criteria

The proposed Policy establishes criteria for diversion season, minimum bypass flow, and maximum cumulative diversion. Complying with these criteria will not have direct significant adverse impacts on the environment and, in fact, will benefit aquatic life by protecting the natural hydrology.

Implementation of the flow-related Policy criteria has the potential to cause affected persons to take actions that could result in changes to the existing physical environment. In some cases, these changes may be significant. Limits on diversion will be beneficial to aquatic life, but, in some situations, implementation of these criteria will limit or reduce the amount of water available for existing and future diversions. Limits on the amount of water available for diversion may have potentially significant impacts on agricultural resources if the available water does not meet crop water demands. Similarly, limits on the amount of water available for diversion could result in potentially significant impacts on domestic and municipal water supply to the extent that available water is insufficient to meet existing or future demand.

Alternatives to the proposed Policy criteria that allow more diversion to occur have a lower chance of causing significant changes to offstream environmental resources than alternatives that allow less diversion. The relative degree to which one alternative may constrain diversion of water versus another alternative can be inferred by comparing the volumes of water potentially available for diversion under each alternative.

6.8 Water Cost Analysis

The quantity of water remaining instream to protect fishery resources is considered a “water cost,” because water needed to remain instream cannot be diverted for other uses. A “water cost analysis” was conducted to evaluate the amount of water that could be diverted under different combinations of Policy criteria for diversion season, maximum cumulative diversion, and minimum bypass flow. The water cost analysis is not intended to provide an absolute forecast of the quantity of water that could be diverted in the Policy Area. Instead, the water cost analysis provides an indication of the relative restrictiveness of combinations of alternative Policy criteria in terms of water cost rather than economic cost. The relative level of potential adverse effects of the different Policy criteria on other environmental resources can be inferred from the restrictiveness of each alternative. In general terms, the less restrictive an alternative is, the less would be its potential adverse effects.

Forty-eight combinations of the criteria were evaluated for their effect on the potential for diversion at 11 of the 13 validation sites used to develop recommendations for the policy alternatives (R2 Resource Consultants 2007). Lagunitas Creek and Olema Creek were excluded because instantaneous peak flow measurements were unavailable for calculation of the 1.5 year flood peak flow needed to calculate MCD2 and MCD4. The analysis was based on a continuous daily record (timeseries) of flow and calculates (1) the daily maximum rate of diversion that could be made in compliance with the alternative Policy criteria that restrict water diversions (diversion season, minimum bypass flow, and maximum cumulative diversion) acting in concert, (2) the daily volume of water diverted at this calculated maximum rate, and (3) the daily volume of water that remains instream. The volume of water that could be diverted each day during the diversion season was summed over the period of record and divided by the number of diversion seasons to determine the average volume of water potentially available for the diversion. The percentage of flow volume that could be diverted was calculated by dividing the average diversion volume by the mean annual flow volume.

6.8.1 Water Cost Analysis Results

Results of the water cost analysis for each of the three diversion season alternatives (i.e., DS1, DS2, and DS3) are presented in Tables 6-12a and b, 6-13a and b, and 6-14a and b, respectively. For each diversion season alternative, results are reported in terms of (a) the volume of water potentially available for diversion during the diversion season, and (b) the percentage of the mean annual flow volume that would potentially be available for diversion. The tables provide a comparison of the potentially available diversion volume and the percentage of the mean annual flow volume available for diversion at each validation site under the various combinations of minimum bypass flow and maximum cumulative diversion.

Figure 6-3 displays the potentially available diversion volume for each combination of the proposed Policy element alternatives averaged for the 11 validations sites. Figure 6-4 displays the percentage of the mean annual flow volume potentially available for diversion, on average, for the 11 validation sites used in the analysis.

The results show that on average the estimated amount water potentially available for diversion ranges from approximately 2 to 25 percent of mean annual flow at all of the validation sites combined depending on the alternative. Six of these alternatives are considered to be regionally protective of fishery resources, 18 are considered partially protective, and 24 are not considered to be protective (Figures 6-3 and 6-4).

The results also show that of the three Policy elements, the maximum cumulative diversion has the most important influence the volume of water that is made potentially available for diversion. This is because the maximum cumulative diversion acts to directly limit the rate or volume of water diversions. The recommended alternative is MCD 2, which is the least restrictive alternative.

The minimum bypass flow has the next most important influence on how the volume of water that is made potentially available for diversion. Its influence is most pronounced when combined with the least restrictive maximum cumulative diversion element alternative, MCD2. This is because the minimum bypass flow indirectly limits water diversions by constraining the times/conditions under which diversions can be made.

Generally, for MBF3 and MBF4, the percentage of the mean annual streamflow volume that is made potentially available for diversion decreases with decreasing drainage area. This is because MBF3 and MBF4 were intentionally formulated to be more restrictive in small drainage areas because it was found that small drainage areas need proportionately more flow for spawning and passage. The recommended alternative is MBF 3.

The diversion season has the least influence on the volume of water that is made potentially available for diversion. This is because in Policy Area streams most of the volume of streamflow occurs during the period October 1 through March 31, and extending the diversion season beyond this period, when streamflows are lower, does not make a comparatively larger volume of water potentially available for diversion.

Table 6-12 a and b
Diversion Season DS1: 12/15 - 3/31

a. Average Potentially Available Diversion Volume During Diversion Season DS1

Stream	Drainage Area (sq.	Water Years Analyzed	Mean Annual Unimpaired Flow		Average Potentially Available Diversion Volume (acre-feet/diversion season)															
					MCD1				MCD2				MCD3				MCD4			
			(cfs)	(acft/year)	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4
E. Fk. Russian River Trib	0.25	1959-1961	0.13	92	6	6	1	2	38	38	8	11	9	9	7	8	6	6	1	2
Dry Creek Trib	1.2	1968-1969	2.2	1,561	88	101	40	61	261	300	123	190	150	150	150	150	171	196	80	119
Dunn Creek	1.9	1962-1964	2.5	1,821	40	29	6	14	142	104	32	63	87	76	49	67	5	4	1	2
Carneros Creek	2.8	2002-2005	3.8	2,732	153	87	36	70	676	462	216	375	190	190	190	190	552	364	163	293
Huichica Creek	4.9	2002-2005	8.9	6,437	389	206	102	226	1,012	595	315	652	447	447	447	447	244	126	61	140
Pine Gulch Creek	7.8	1999-2003	12	8,966	424	352	265	525	1,746	1,506	1,199	2,018	705	666	622	705	84	66	49	102
Warm Springs Creek	12.2	1974-1983	35	25,168	1,828	1,086	1,145	2,046	3,440	2,154	2,267	3,844	1,545	1,542	1,542	1,549	1,062	618	650	1,188
Santa Rosa Creek	12.5	1960-1970	19	13,867	578	435	386	764	2,752	2,216	2,018	3,297	1,084	1,071	1,046	1,084	507	381	338	675
Albion River	14.4	1962-1969	20	14,489	874	556	608	1,001	2,420	1,614	1,743	2,691	1,130	1,130	1,130	1,130	802	509	557	921
Salmon Creek	15.7	1963-1975	25	17,912	1,025	648	629	1,095	4,090	2,882	2,800	4,280	1,424	1,389	1,385	1,424	1,101	699	678	1,175
Franz Creek	15.7	1964-1968	24	17,450	735	395	407	696	3,460	2,114	2,183	3,349	1,196	1,196	1,196	1,196	626	322	342	591
				Average	***558***	***355***	***330***	***591***	***1,822***	***1,271***	***1,173***	***1,888***	***724***	***715***	***706***	***723***	***469***	***299***	***265***	***473***
							Max. Protect.						**DFG-NMFS**							

b. Percentage of Mean Annual Flow Volume Potentially Available for Diversion During Diversion Season DS1

Stream	Drainage Area (sq.	Water Years Analyzed	Mean Annual Unimpaired Flow		Percent of Mean Annual Flow Volume Potentially Available for Diversion															
					MCD1				MCD2				MCD3				MCD4			
			(cfs)	(acft/year)	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4
E. Fk. Russian River Trib	0.25	1959-1961	0.13	92	7%	7%	1%	2%	41%	41%	9%	12%	10%	10%	8%	9%	7%	7%	1%	2%
Dry Creek Trib	1.2	1968-1969	2.2	1,561	6%	6%	3%	4%	17%	19%	8%	12%	10%	10%	10%	10%	11%	13%	5%	8%
Dunn Creek	1.9	1962-1964	2.5	1,821	2%	2%	0%	1%	8%	6%	2%	3%	5%	4%	3%	4%	0%	0%	0%	0%
Carneros Creek	2.8	2002-2005	3.8	2,732	6%	3%	1%	3%	25%	17%	8%	14%	7%	7%	7%	7%	20%	13%	6%	11%
Huichica Creek	4.9	2002-2005	8.9	6,437	6%	3%	2%	4%	16%	9%	5%	10%	7%	7%	7%	7%	4%	2%	1%	2%
Pine Gulch Creek	7.8	1999-2003	12	8,966	5%	4%	3%	6%	19%	17%	13%	23%	8%	7%	7%	8%	1%	1%	1%	1%
Warm Springs Creek	12.2	1974-1983	35	25,168	7%	4%	5%	8%	14%	9%	9%	15%	6%	6%	6%	6%	4%	2%	3%	5%
Santa Rosa Creek	12.5	1960-1970	19	13,867	4%	3%	3%	6%	20%	16%	15%	24%	8%	8%	8%	8%	4%	3%	2%	5%
Albion River	14.4	1962-1969	20	14,489	6%	4%	4%	7%	17%	11%	12%	19%	8%	8%	8%	8%	6%	4%	4%	6%
Salmon Creek	15.7	1963-1975	25	17,912	6%	4%	4%	6%	23%	16%	16%	24%	8%	8%	8%	8%	6%	4%	4%	7%
Franz Creek	15.7	1964-1968	24	17,450	4%	2%	2%	4%	20%	12%	13%	19%	7%	7%	7%	7%	4%	2%	2%	3%
				Average	***5%***	***4%***	***2%***	***4%***	***20%***	***16%***	***10%***	***16%***	***7%***	***7%***	***7%***	***7%***	***6%***	***5%***	***3%***	***5%***

Table 6-13 a and b
Diversion Season DS2: 10/1 - 9/30 (year-round)

a. Average Potentially Available Diversion Volume During Diversion Season DS2

Stream	Drainage Area (sq.	Water Years Analyzed	Mean Annual Unimpaired Flow		Average Potentially Available Diversion Volume (acre-feet/diversion season)															
					MCD1				MCD2				MCD3				MCD4			
			(cfs)	(acft/year)	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4
E. Fk. Russian River Trib	0.25	1959-1961	0.13	92	7	7	1	2	39	39	9	11	9	9	8	9	7	7	1	2
Dry Creek Trib	1.2	1968-1969	2.2	1,561	90	103	40	62	266	305	123	195	156	156	154	156	175	199	80	123
Dunn Creek	1.9	1962-1964	2.5	1,821	69	52	12	29	267	203	65	128	182	182	141	182	9	7	2	4
Carneros Creek	2.8	2002-2005	3.8	2,732	194	108	43	86	836	562	267	454	273	273	273	273	686	444	200	354
Huichica Creek	4.9	2002-2005	8.9	6,437	491	250	125	276	1,252	722	382	792	644	644	644	644	311	153	76	171
Pine Gulch Creek	7.8	1999-2003	12	8,966	498	411	302	627	2,021	1,734	1,367	2,356	856	809	765	897	98	78	57	126
Warm Springs Creek	12.2	1974-1983	35	25,168	2,298	1,329	1,406	2,636	4,317	2,625	2,771	4,888	2,037	2,013	2,013	2,052	1,343	757	800	1,555
Santa Rosa Creek	12.5	1960-1970	19	13,867	748	558	491	991	3,468	2,722	2,446	4,205	1,387	1,342	1,312	1,387	656	488	430	876
Albion River	14.4	1962-1969	20	14,489	1,232	724	807	1,411	3,327	2,038	2,235	3,737	1,449	1,449	1,449	1,449	1,131	663	740	1,297
Salmon Creek	15.7	1963-1975	25	17,912	1,339	808	781	1,439	5,163	3,531	3,424	5,428	1,784	1,727	1,721	1,790	1,636	871	842	1,542
Franz Creek	15.7	1964-1968	24	17,450	1,223	626	651	1,167	5,673	3,108	3,239	5,482	1,745	1,745	1,745	1,745	1,038	527	550	990
				Average	***744***	***452***	***424***	***793***	***2,421***	***1,599***	***1,484***	***2,516***	***957***	***941***	***930***	***962***	***645***	***381***	***343***	***640***

b. Percentage of Mean Annual Flow Volume Potentially Available for Diversion During Diversion Season DS2

Stream	Drainage Area (sq.	Water Years Analyzed	Mean Annual Unimpaired Flow		Percent of Mean Annual Flow Volume Potentially Available for Diversion															
					MCD1				MCD2				MCD3				MCD4			
			(cfs)	(acft/year)	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4
E. Fk. Russian River Trib	0.25	1959-1961	0.13	92	8%	8%	1%	2%	42%	42%	10%	12%	10%	10%	9%	10%	8%	8%	1%	2%
Dry Creek Trib	1.2	1968-1969	2.2	1,561	6%	7%	3%	4%	17%	20%	8%	12%	10%	10%	10%	10%	11%	13%	5%	8%
Dunn Creek	1.9	1962-1964	2.5	1,821	4%	3%	1%	2%	15%	11%	4%	7%	10%	10%	8%	10%	0%	0%	0%	0%
Carneros Creek	2.8	2002-2005	3.8	2,732	7%	4%	2%	3%	31%	21%	10%	17%	10%	10%	10%	10%	25%	16%	7%	13%
Huichica Creek	4.9	2002-2005	8.9	6,437	8%	4%	2%	4%	19%	11%	6%	12%	10%	10%	10%	10%	5%	2%	1%	3%
Pine Gulch Creek	7.8	1999-2003	12	8,966	6%	5%	3%	7%	23%	19%	15%	26%	10%	9%	9%	10%	1%	1%	1%	1%
Warm Springs Creek	12.2	1974-1983	35	25,168	9%	5%	6%	10%	17%	10%	11%	19%	8%	8%	8%	8%	5%	3%	3%	6%
Santa Rosa Creek	12.5	1960-1970	19	13,867	5%	4%	4%	7%	25%	20%	18%	30%	10%	10%	9%	10%	5%	4%	3%	6%
Albion River	14.4	1962-1969	20	14,489	9%	5%	6%	10%	23%	14%	15%	26%	10%	10%	10%	10%	8%	5%	5%	9%
Salmon Creek	15.7	1963-1975	25	17,912	7%	5%	4%	8%	29%	20%	19%	30%	10%	10%	10%	10%	9%	5%	5%	9%
Franz Creek	15.7	1964-1968	24	17,450	7%	4%	4%	7%	33%	18%	19%	31%	10%	10%	10%	10%	6%	3%	3%	6%
				Average	***7%***	***5%***	***3%***	***6%***	***25%***	***19%***	***12%***	***20%***	***10%***	***10%***	***9%***	***10%***	***8%***	***5%***	***3%***	***6%***
				Rank all 11 validation sites	***27***	***37***	***44***	***30***	***1***	***5***	***10***	***3***	***14***	***15***	***16***	***13***	***21***	***32***	***43***	***31***
				Rank small sites (<10 sq. miles)	***30***	***34***	***46***	***40***	***1***	***4***	***15***	***7***	***11***	***12***	***13***	***10***	***18***	***28***	***43***	***36***
				Rank large sites (>10 sq. miles)	***22***	***38***	***37***	***20***	***2***	***8***	***7***	***1***	***14***	***15***	***16***	***13***	***29***	***42***	***41***	***28***

Table 6-14 a and b
Diversion Season DS3: 10/1 - 3/31

a. Average Potentially Available Diversion Volume During Diversion Season DS3

Stream	Drainage	Water Years	Mean Annual		Average Potentially Available Diversion Volume (acre-feet/diversion season)															
	Area	Analyzed	Unimpaired Flow		MCD1				MCD2				MCD3				MCD4			
	(sq.		(cfs)	(acft/year)	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4
E. Fk. Russian River Trib	0.25	1959-1961	0.13	92	6	6	1	2	39	39	9	11	9	9	8	9	6	6	1	2
Dry Creek Trib	1.2	1968-1969	2.2	1,561	90	103	40	62	266	305	123	195	154	154	153	154	175	199	80	123
Dunn Creek	1.9	1962-1964	2.5	1,821	55	39	6	20	198	144	35	83	123	123	67	110	7	5	1	3
Carneros Creek	2.8	2002-2005	3.8	2,732	179	104	43	84	804	555	267	452	240	240	240	240	654	437	200	352
Huichica Creek	4.9	2002-2005	8.9	6,437	453	245	123	268	1,186	710	382	776	563	563	563	563	285	149	76	166
Pine Gulch Creek	7.8	1999-2003	12	8,966	476	397	293	586	1,946	1,673	1,319	2,252	789	729	684	789	93	75	55	115
Warm Springs Creek	12.2	1974-1983	35	25,168	2,062	1,227	1,294	2,327	3,889	2,434	2,561	4,360	1,755	1,752	1,752	1,759	1,199	699	735	1,359
Santa Rosa Creek	12.5	1960-1970	19	13,867	639	482	428	846	3,045	2,451	2,232	3,650	1,209	1,197	1,167	1,209	561	422	375	748
Albion River	14.4	1962-1969	20	14,489	1,048	622	687	1,210	2,821	1,797	1,950	3,176	1,277	1,277	1,277	1,277	962	569	629	1,113
Salmon Creek	15.7	1963-1975	25	17,912	1,207	753	731	1,291	4,768	3,333	3,238	4,996	1,633	1,582	1,579	1,633	1,296	812	788	1,385
Franz Creek	15.7	1964-1968	24	17,450	1,045	567	586	999	4,985	2,894	3,003	4,828	1,546	1,546	1,546	1,546	888	477	494	847
				Average	***660***	***413***	***385***	***700***	***2,177***	***1,485***	***1,374***	***2,253***	***845***	***834***	***821***	***844***	***557***	***350***	***312***	***565***

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b. Percentage of Mean Annual Flow Volume Potentially Available for Diversion During Diversion Season DS3

Stream	Drainage	Water Years	Mean Annual		Percent of Mean Annual Flow Volume Potentially Available for Diversion															
	Area	Analyzed	Unimpaired Flow		MCD1				MCD2				MCD3				MCD4			
	(sq.		(cfs)	(acft/year)	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4	MBF1	MBF2	MBF3	MBF4
E. Fk. Russian River Trib	0.25	1959-1961	0.13	92	7%	7%	1%	2%	42%	42%	10%	12%	10%	10%	9%	10%	7%	7%	1%	2%
Dry Creek Trib	1.2	1968-1969	2.2	1,561	6%	7%	3%	4%	17%	20%	8%	12%	10%	10%	10%	10%	11%	13%	5%	8%
Dunn Creek	1.9	1962-1964	2.5	1,821	3%	2%	0%	1%	11%	8%	2%	5%	7%	7%	4%	6%	0%	0%	0%	0%
Carneros Creek	2.8	2002-2005	3.8	2,732	7%	4%	2%	3%	29%	20%	10%	17%	9%	9%	9%	9%	24%	16%	7%	13%
Huichica Creek	4.9	2002-2005	8.9	6,437	7%	4%	2%	4%	18%	11%	6%	12%	9%	9%	9%	9%	4%	2%	1%	3%
Pine Gulch Creek	7.8	1999-2003	12	8,966	5%	4%	3%	7%	22%	19%	15%	25%	9%	8%	8%	9%	1%	1%	1%	1%
Warm Springs Creek	12.2	1974-1983	35	25,168	8%	5%	5%	9%	15%	10%	10%	17%	7%	7%	7%	7%	5%	3%	3%	5%
Santa Rosa Creek	12.5	1960-1970	19	13,867	5%	3%	3%	6%	22%	18%	16%	26%	9%	9%	8%	9%	4%	3%	3%	5%
Albion River	14.4	1962-1969	20	14,489	7%	4%	5%	8%	19%	12%	13%	22%	9%	9%	9%	9%	7%	4%	4%	8%
Salmon Creek	15.7	1963-1975	25	17,912	7%	4%	4%	7%	27%	19%	18%	28%	9%	9%	9%	9%	7%	5%	4%	8%
Franz Creek	15.7	1964-1968	24	17,450	6%	3%	3%	6%	29%	17%	17%	28%	9%	9%	9%	9%	5%	3%	3%	5%
				Average	***6%***	***4%***	***3%***	***5%***	***23%***	***18%***	***11%***	***19%***	***9%***	***9%***	***8%***	***9%***	***7%***	***5%***	***3%***	***5%***
				Rank all 11 validation sites	***28***	***41***	***46***	***35***	***2***	***7***	***11***	***6***	***17***	***19***	***20***	***18***	***26***	***36***	***45***	***34***
				Rank small sites (<10 sq. miles)	***32***	***35***	***47***	***41***	***2***	***5***	***19***	***8***	***14***	***16***	***21***	***17***	***20***	***29***	***44***	***37***
				Rank large sites (>10 sq. miles)	***30***	***40***	***39***	***23***	***4***	***10***	***9***	***3***	***18***	***19***	***21***	***17***	***33***	***46***	***44***	***31***

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Figure 6-3. Estimated Average Volume of Water Potentially Available for Diversion at 11 North Coast Validation Sites

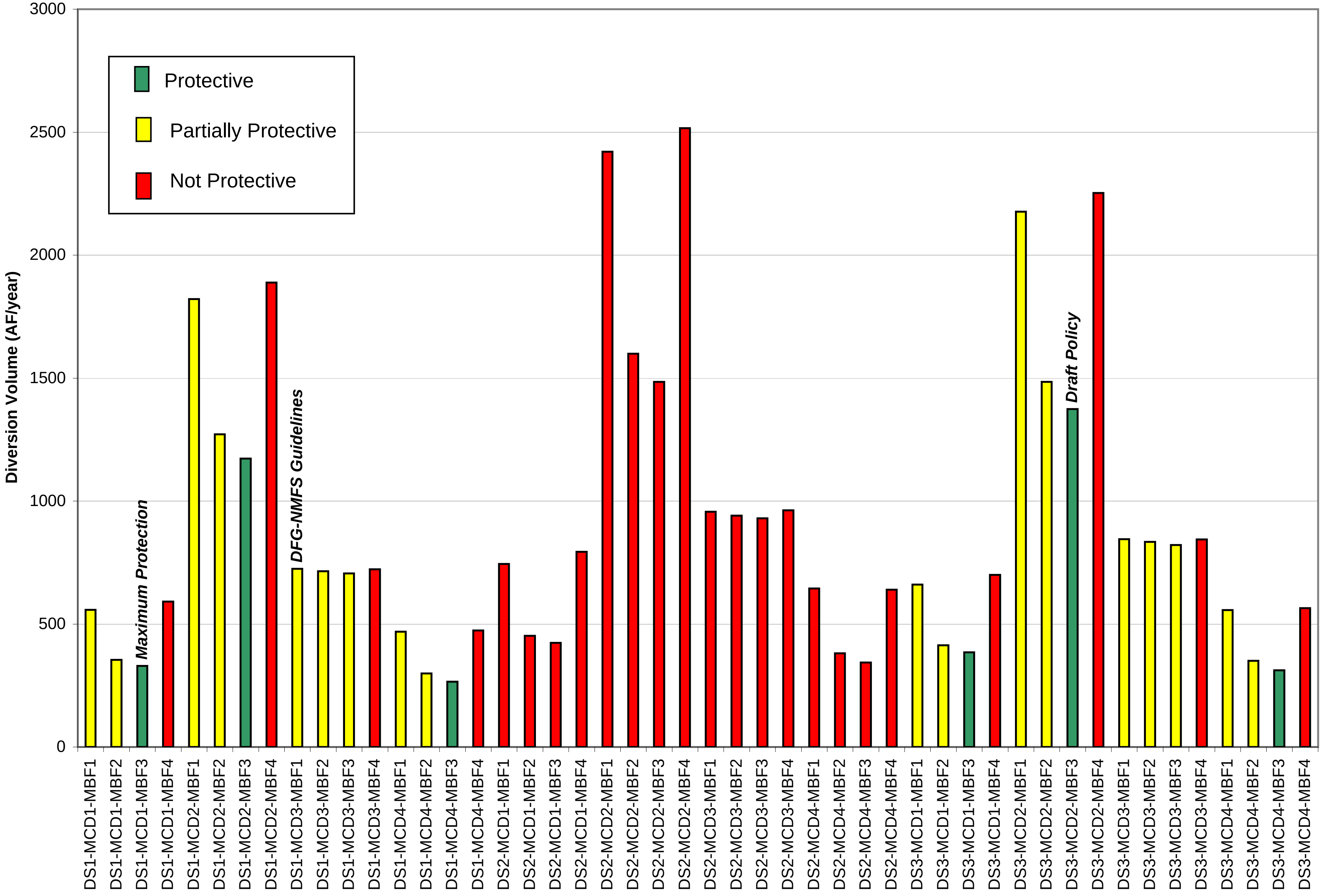


Figure 6-4. Estimated Percent of Mean Annual Flow Volume Potentially Available for Diversion at 11 North Coast Validation Sites

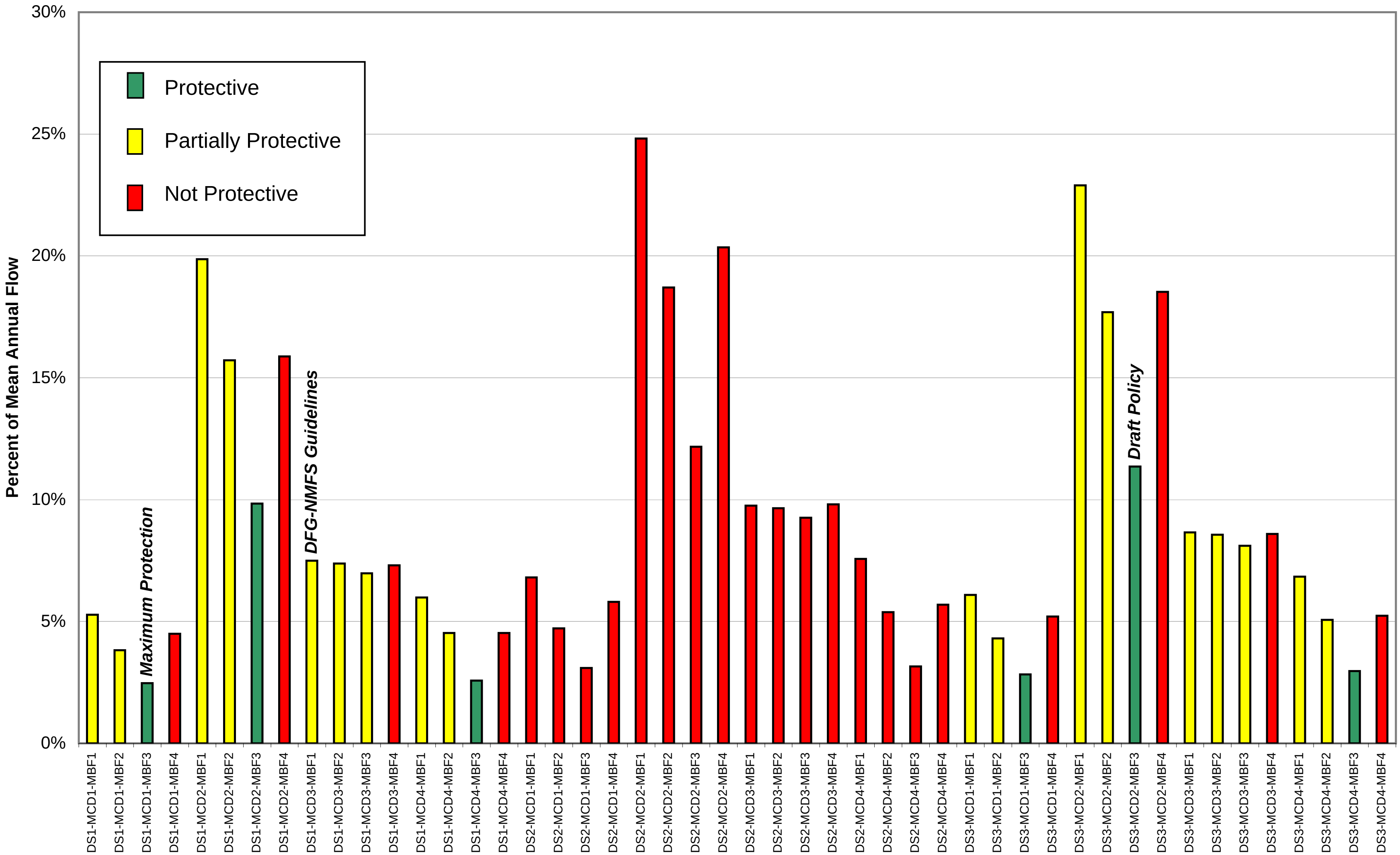


Figure 6-5. Estimated Average Volume of Water Potentially Available for Diversion for Policy Alternatives

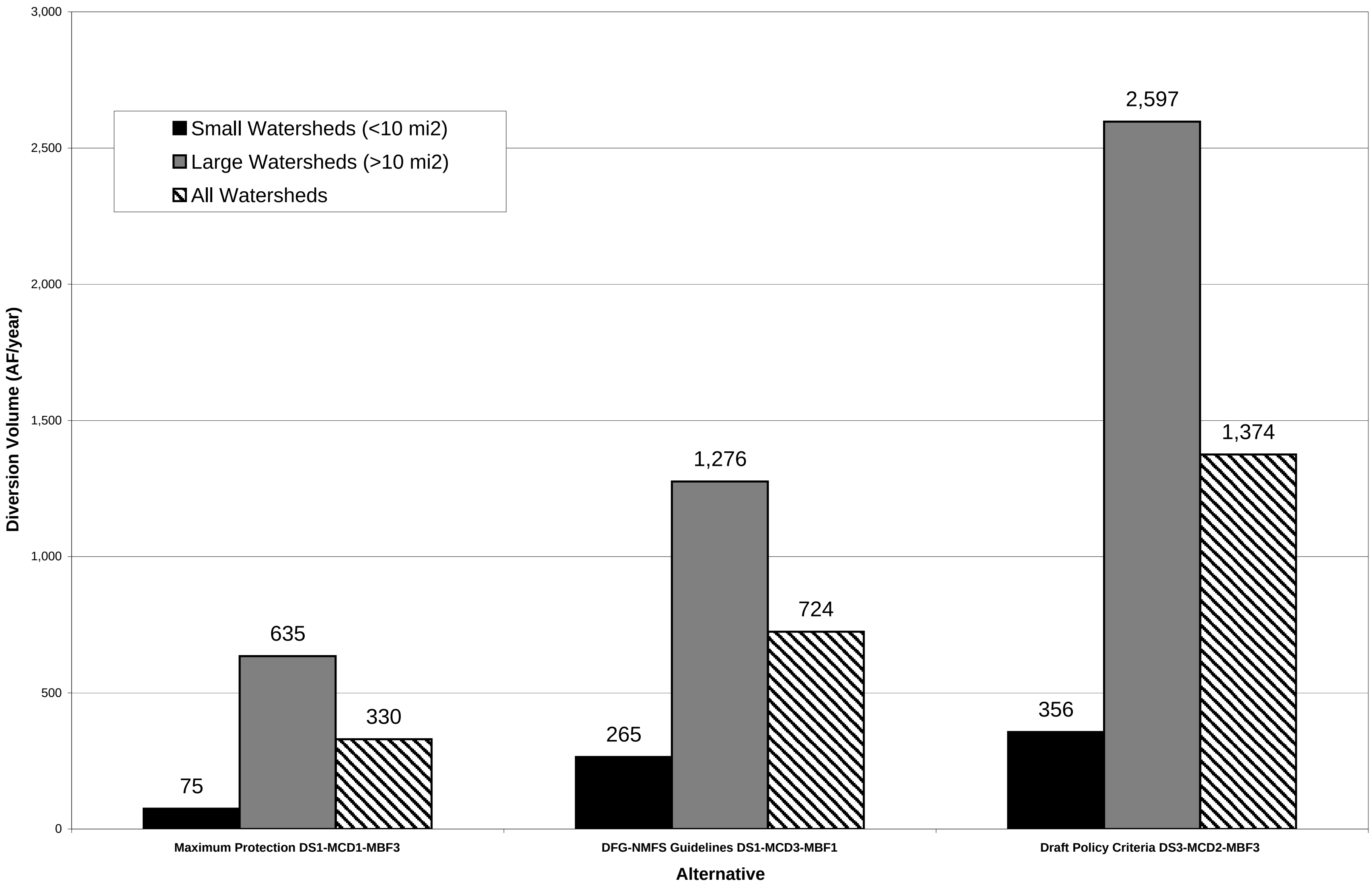
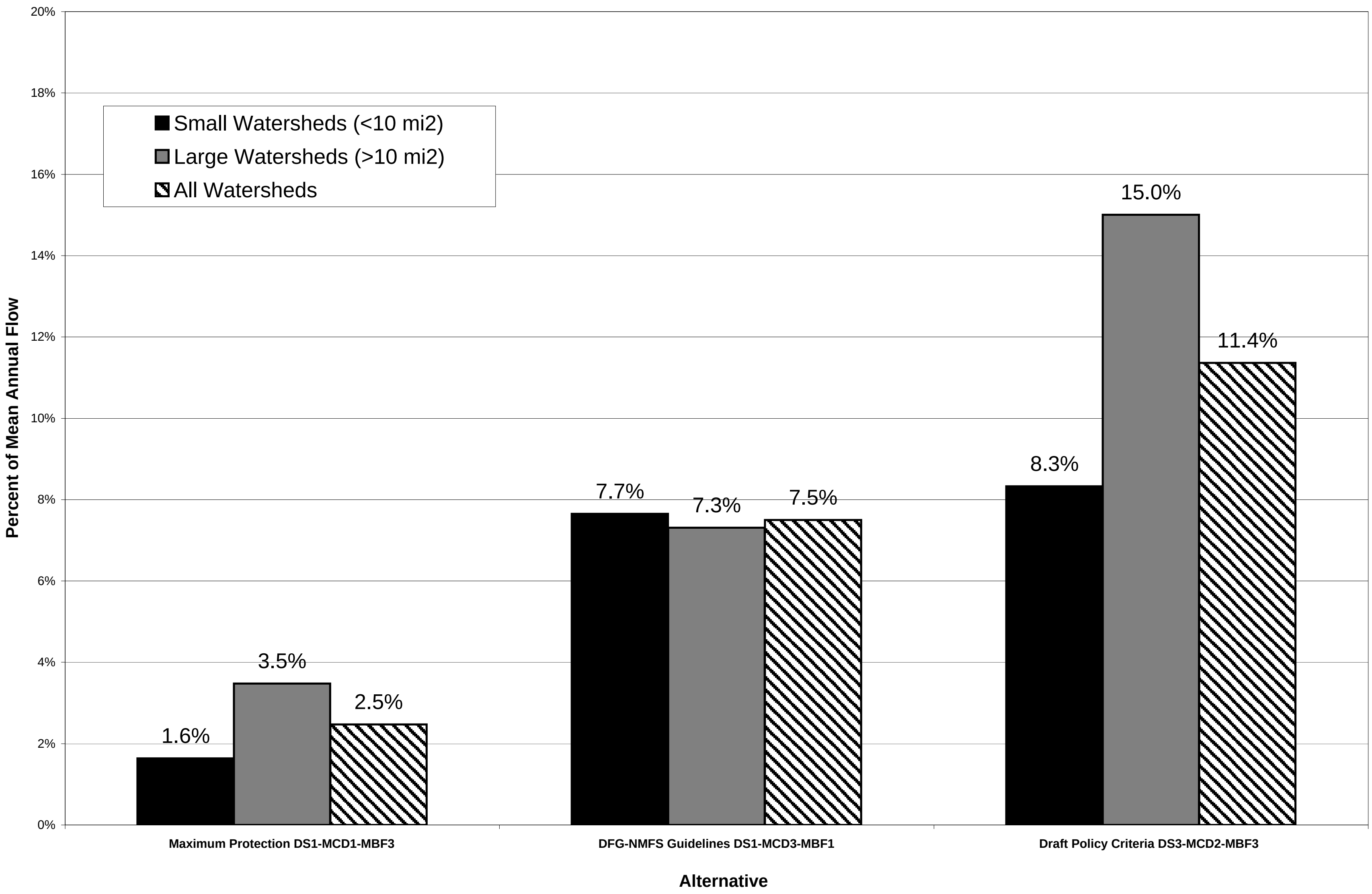


Figure 6-6. Estimated Percent of Mean Annual Flow Volume Potentially Available for Diversion for Policy Alternatives



6.8.2 Restrictiveness of the Proposed Policy and Alternatives

There are 48 possible combinations of Policy element alternatives for diversion season, minimum bypass flow, and maximum cumulative diversion. Three combinations are described in more detail below to allow for closer comparison of the water cost associated with a reasonable range of alternatives (Table 6-15).

Table 6-15. Proposed Policy and Alternatives

ALTERNATIVE	COMBINATION OF CRITERIA	PROTECTIVENESS[1]
Maximum Protectiveness	DS1-MCD1-MBF3	Protective
DFG-NMFS Guidelines	DS1-MCD3-MBF1	Partially Protective
Proposed Policy	DS3-MCD2-MBF3	Protective

[1] Based on analysis contained in R2 Resource Consultants, 2007.

The Maximum Protectiveness Alternative is composed of the combination of diversion season, maximum cumulative diversion, and minimum bypass flow criteria that were determined to be most protective. The CDFG-NMFS Draft Guidelines alternative represents the criteria contained in the 2002 CDFG-NMFS Draft Guidelines. The CDFG-NMFS Draft Guidelines permit the use of MCD 1 (15% of 20% winter exceedance flow) or MCD3 (10% of the seasonal unimpaired flow) for calculating maximum cumulative diversion. However, MCD3 allows more diversion than MCD1 and is therefore used for comparative purposes in this analysis. Finally, the Policy alternative contains the set of criteria that are regionally protective of fishery resources and allow the most diversion out of the six regionally protective combinations of criteria that could have been selected.

On average the three Policy alternatives identified in Table 6-15 allow between 2 and 11 percent of the mean annual flow volume to be diverted. Conversely, between 98 and 89 percent of stream flow would need to remain instream. Figure 6-5 shows the potentially available diversion volume associated with each of the three combinations of criteria for three sets of validation sites: (1) 6 small validations sites (less than 10 square miles; (2) the 5 large validation sites (greater than 10 square miles); and (3) all validations sites with complete results. Figure 6-6 shows the same information expressed as percentage of mean annual flow. These figures demonstrate that the proposed Policy alternative would allow more diversion to occur than if the CDFG-NMFS Guidelines criteria were applied. Additionally, Figures 6-5 and 6-6 show that the proposed Policy alternative allows the greatest amount of diversion compared to the other combinations of criteria that were determined to be regionally protective.

Based on this comparison, the relative degree to which the proposed Policy may lead affected persons to take actions that could result in indirect environmental effects would be expected to be the least for the proposed Policy. It follows then that the proposed Policy, by virtue of it being the least restrictive, would result in the least environmental effects. But the relative reduction in environmental effects cannot be determined because actions taken by affected persons cannot be accurately predicted. The 48 possible combinations of criteria were ranked in order of least restrictive to most restrictive in terms of diversion. Table 6-16 summarizes the rankings of the combinations of criteria that correspond to the three Policy alternatives described above: the

Maximum Protectiveness Alternative (DS1, MCD1, and MBF3), the CDFG-NMFS Draft Guidelines (DS1, MCD3, and MBF1), and the proposed Policy (DS3, MCD2, and MBF3). The rankings were ordered from least restrictive to most restrictive based on the percentage of the mean annual flow volume potentially available for diversion. In other words, the combination of criteria ranked 1 would allow the most diversion and the combination of criteria ranked 48 would allow least the least diversion.

Table 6-16. Rankings of Policy Alternatives (out of 48 possible)

VALIDATION SITES RESULTS USED FOR RANKING	MAXIMUM PROTECTIVENESS	CDFG-NMFS GUIDELINES	PROPOSED POLICY
All 11 sites	48	22	11
6 small sites (less than 10 sq. miles)	48	22	19
5 large sites (greater than 10 sq. miles)	43	25	9

Based on an average over all 11 validation sites with complete results, the Policy ranks number 11 in order of least restrictiveness; that is, it allows the eleventh highest percentage of mean annual flow volume for diversion out of the possible 48 combinations. The CDFG-NMFS combination ranks 22 and the Maximum Protectiveness Alternative combination ranks 48.

6.9 Cumulative and Long-Term Impacts

Cumulative impacts can result from "the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects" (CEQA Guidelines, § 15355, subd. (b)). Adoption and implementation of the proposed Policy will not result in any direct impacts on the environment, and thus there are no direct cumulative impacts. Implementation of the proposed Policy may result in indirect environmental impacts as a result of actions taken by affected persons in response to the Policy. As discussed in section 6, The State Water Board evaluated the environmental impacts associated with the following actions:

- increasing groundwater extraction and use,
- increasing diversions under claim of riparian rights,
- relying on other alternative water sources and water conservation,
- removing or modifying onstream storage and regulatory dams,
- constructing new and expanding existing offstream storage facilities,
- constructing offstream reservoirs, and
- constructing passive bypass systems.

The environmental impacts of actions taken by affected persons that are individually limited may be cumulatively considerable when viewed in conjunction with the effects of foreseeable past, current, and probable future projects in the Policy Area. The State Water Board considered foreseeable past, current, and probable projects to include two categories of land use and development projects in the Policy Area that may have impacts that are similar two the proposed Policy: (1) projects requiring water supplies (e.g., conversion of natural lands to agricultural use); and (2) projects developing water supplies under other bases of right (e.g., expanded groundwater pumping for domestic and municipal use). The proposed Policy, in combination with these land use and water development projects, may have cumulative impacts on the environment that are similar to the Policy-related impacts discussed in section 6. For example, the proposed Policy may result in adverse environmental impacts related to dam modification and removal. To the extent that the land use and water development projects are not regulated by the State Water Board, they are within the purview of local governments and those entities can and should avoid or mitigate their significant environmental impacts.

In this assessment of cumulative and long-term environmental effects, the State Water Board considered potential effects associated with global climate change. The Global Warming Solutions Act of 2006 requires the State to reduce its global warming emissions to year 2000 levels by the year 2010, to 1990 levels by 2020, and 80 percent below 1990 levels by 2050. Adoption of the proposed Policy will have no direct consequences in terms of global climate change. Implementation would be associated with some level of construction, particularly for the modification or removal of dams, and these projects would involve emissions from vehicles and equipment that would contribute to greenhouse gasses.

From another perspective, changes in climate may affect environmental conditions, such as rises in surface water levels in estuaries and increases in water temperatures in coastal streams. Even minor changes in temperature, for example, would likely have implications for salmonids, and adverse effects related to temperature could be exacerbated by changes in stream flow, particularly if temperatures increase. Put another way, the beneficial impacts of the Policy in terms of anadromous fish passage and habitat may serve to reduce some of the adverse impacts of climate change.

The State Water Board and other state and local agencies will need to address potential cumulative impacts in project-specific documentation. Individual projects will be subject to the appropriate level of environmental review at the time they are proposed, and mitigation would be identified to avoid or reduce the adverse effects of potentially significant effects, prior to any project-level action.

7 SUMMARY OF IMPACTS AND MITIGATION MEASURES IN POLICY-BASED REVIEWS OF PENDING AND FUTURE WATER RIGHT APPLICATIONS

Implementation of the Policy would have no direct effects; all of the environmental effects are indirect effects that may result from actions taken by affected persons in response to the Policy. As discussed in this substitute document, significant impacts arise out of the following actions that may be taken by affected persons in attempting to either comply with the Policy or avoid compliance. The actions that affected persons may take in order to comply with the Policy include:

- removing or modifying onstream storage and regulatory dams, and
- constructing new and expanding existing offstream storage facilities.

The actions that affected persons may take in order to avoid complying with the Policy include:

- removing or modifying onstream storage and regulatory dams,
- increasing groundwater extraction and use,
- increasing diversions under claim of riparian rights,
- relying on other alternative water sources and water conservation, and
- constructing new and expanding existing offstream storage facilities.

The potential impacts of these actions by affected persons on environmental resources are identified in section 6. As discussed in that section, some of the environmental effects of actions could be significant. In many cases, the significance of the impacts resulting from actions by third parties will depend on the timing, specific components, site-specific location, and other characteristics of the project-specific actions being proposed. The results of this assessment are summarized in table 7-1.

Table 7-1. Summary of Significance Determinations by Potential Action and Resource Areas

	POTENTIAL ACTION BY AFFECTED PARTY				
ENVIRONMENTAL ISSUE AREA	INCREASED GROUNDWATER EXTRACTION AND USE	INCREASED DIVERSIONS VIA RIPARIAN RIGHTS	RELIANCE ON OTHER ALTERNATIVE WATER SOURCES AND ON WATER CONSERVATION	REMOVAL OR MODIFICATION OF ONSTREAM STORAGE AND REGULATORY DAMS	CONSTRUCTION OF NEW AND EXPANSION OF EXISTING OFFSTREAM STORAGE
Aesthetics	Potentially significant	Not significant	Potentially significant	Potentially significant	Potentially significant
Agriculture Resources	Potentially Significant	Not significant	Potentially significant	Potentially significant	Potentially significant
Air Quality	Potentially significant	Potentially significant	Potentially significant	Potentially significant	Potentially significant

Table 7-1. Summary of Significance Determinations by Potential Action and Resource Areas

ENVIRONMENTAL ISSUE AREA	POTENTIAL ACTION BY AFFECTED PARTY				
	INCREASED GROUNDWATER EXTRACTION AND USE	INCREASED DIVERSIONS VIA RIPARIAN RIGHTS	RELIANCE ON OTHER ALTERNATIVE WATER SOURCES AND ON WATER CONSERVATION	REMOVAL OR MODIFICATION OF ONSTREAM STORAGE AND REGULATORY DAMS	CONSTRUCTION OF NEW AND EXPANSION OF EXISTING OFFSTREAM STORAGE
Biological Resources	Potentially significant	Potentially significant	Potentially significant	Potentially significant	Potentially significant
Cultural Resources	Potentially significant	Not significant	Potentially significant	Potentially significant	Potentially significant
Geology/Soils	Potentially significant	Not significant	Potentially significant	Potentially significant	Potentially significant
Hazards & Hazardous Materials	Potentially significant	Not Significant	Potentially significant	Not Significant	Potentially significant
Hydrology/Water Quality	Potentially significant	Potentially significant	Potentially significant	Potentially significant	Potentially significant
Land Use/Planning	Potentially significant	Not Significant	Potentially significant	Potentially significant	Potentially significant
Mineral Resources	Not significant	Not significant	Not significant	Not significant	Potentially significant
Noise	Potentially significant	Potentially significant	Potentially significant	Potentially significant	Potentially significant
Population/Housing	Not significant	Not significant	Potentially significant	Not significant	Not significant
Public Services	Not significant	Not significant	Potentially significant	Not significant	Potentially significant
Recreation	Potentially significant	Potentially significant	Not significant	Potentially significant	Potentially significant
Transportation/ Traffic	Potentially significant	Not significant	Potentially significant	Not significant	Potentially significant
Utilities/Service Systems	Potentially significant	Not significant	Potentially significant	Potentially significant	Potentially significant

Examples of public agencies that could serve as the CEQA lead agency for subsequent environmental reviews of actions proposed by persons in response to implementation of the Policy include:

- State Water Board,
- Local municipalities and county governments,
- Special districts with discretionary approval authority,
- California Department of Fish and Game,
- California Regional Water Quality Control Board—North Coast and San Francisco Bay Regions,
- California Department of Parks and Recreation, and
- California Coastal Commission.

Future CEQA reviews conducted by the State Water Board or by another lead agency can be expected to identify any significant project-specific environmental effects and mitigate them to less-than-significant levels. In addition, other regulatory mechanisms can also be expected to provide opportunities for minimizing and avoiding significant environmental effects. The State Water Board anticipates that the Instream Flow Policy will be used in reviews of water right applications, small domestic use and livestock stockpond registrations, diversions from subterranean streams, and water right petitions. Terms and conditions can be added as needed to water rights issued by the State Water Board to ensure that the specific projects are carried out in ways that avoid or minimize the potential significant environmental effects.

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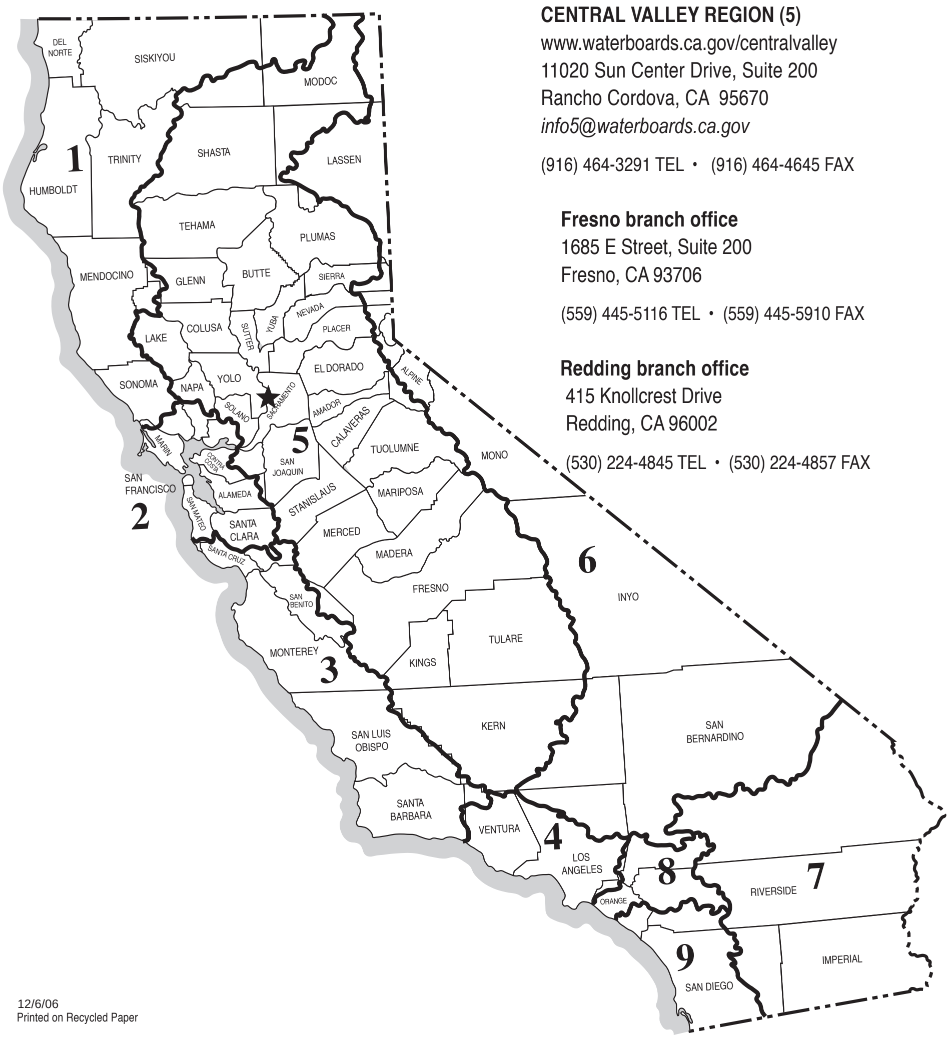

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