POLICY FOR MAINTAINING INSTREAM FLOWS IN NORTHERN CALIFORNIA COASTAL STREAMS

STAFF RESPONSES TO SUGGESTED EDITS RECEIVED FROM TROUT UNLIMITED, WAGNER & BONSIGNORE, AND ELLISON, SCHNEIDER & HARRIS ON APRIL 9, 2010

This document contains embedded staff comments to identify the major concepts and suggested language from the Joint Stakeholders' April 9, 2010 submittal that were included in the April 2010 revised draft policy. Major concepts or suggested language not included in the April 2010 revised draft policy are also identified with reasons for the staff recommendation.

APRIL 2010

POLICY FOR MAINTAINING INSTREAM FLOWS

IN NORTHERN CALIFORNIA COASTAL STREAMS

DRAFT

REVISED FEBRUARY 2010

STATE WATER RESOURCES CONTROL BOARD
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

INSERT STATE WATER BOARD RESOLUTION

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

CDF	California Department of Forestry
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFII	Cumulative Flow Impairment Index
DA	Drainage Area
DFG	California Department of Fish and Game
Division	Division of Water Rights
DWR	California Department of Water Resources
ESA	Federal Endangered Species Act
ESU	Evolutionarily Significant Unit
MBF	Minimum Bypass Flow
MCD	Maximum Cumulative Diversion
NMFS	National Marine Fisheries Service
POD	Point of Diversion
POI	Point of Interest
QA/QC	Quality Assurance/Quality Control
Q	Flow
Q_m	Unimpaired Mean Annual Flow
Q_{MBF}	Minimum Bypass Flow
R2	R2 Resource Consultants
SED	Substitute Environmental Document
State Water Board	State Water Resources Control Board
Stetson	Stetson Engineers
USGS	US Geological Survey

POLICY FOR MAINTAINING INSTREAM FLOWS IN NORTHERN CALIFORNIA COASTAL STREAMS

1.0 INTRODUCTION

The State Water Resources Control Board (State Water Board or Board) adopted this state policy for water quality control on _____, 2010. This policy is also known as the North Coast Instream Flow Policy. It applies to applications to appropriate water, small domestic use and livestock stockpond registrations, and water right petitions.

Water Code section 1259.4, which was added by Assembly Bill 2121 (Stats. 2004, ch. 943, § 3), requires the State Water Board to adopt principles and guidelines for maintaining instream flows in northern California coastal streams as part of state policy for water quality control, for the purposes of water right administration. This policy implements Water Code section 1259.4. The geographic scope of this policy, referred to as the policy area, extends to five counties—Marin, Sonoma, and portions of Napa, Mendocino, and Humboldt counties— and encompasses (1) coastal streams from the Mattole River (originating in Humboldt County) to San Francisco, and (2) coastal streams entering northern San Pablo Bay.

This policy focuses on measures that protect native fish populations, with a particular focus on **anadromous salmonids**[1] (e.g., steelhead trout, coho salmon, and chinook salmon) and their habitat. Beginning in 1996, the National Marine Fisheries Services (NMFS) and the California Department of Fish and Game (DFG) listed steelhead trout, coho salmon, and chinook salmon as "threatened" under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA), respectively. In 2005, the coho salmon's status was upgraded from threatened to "endangered" on both the ESA and the CESA lists.

A number of factors led to the decline of anadromous salmonid populations in the policy area. Climatic variation, disease, predation, loss of genetic diversity, fish harvesting, and land and water use all pose an ongoing threat to salmonids. Degradation and loss of freshwater habitat is one of the leading causes for the decline of salmonids in California (DFG, 2004). Historical and continuing urban, agricultural, and timber harvest land use practices affect fish habitat by increasing pollutant loading and causing sedimentation of spawning gravels. Land use practices also result in removal of riparian habitat and physical alteration of stream channels, including the creation of barriers to fish migration. Water diversion results in a significant loss of fish habitat in California (NMFS, 1996). Water withdrawals change the natural hydrologic patterns of streams and can directly result in loss or reduction of the physical habitat that fish occupy. Flow reduction can exacerbate many of the problems associated with land use practices by reducing the capacity of streams to assimilate pollutants. Construction and operation of dams and diversions create barriers to fish migration, thereby blocking fish

[1] The first usage of terms defined in the Glossary of Terms (Appendix I) is indicated in bold.

from access to historical habitat. Dams also disrupt the flow of food (i.e., aquatic insects), woody debris, and gravel needed to maintain downstream fish habitat.

For the processing of water right applications prior to the adoption of this policy, the State Water Board considered the recommendations in the 2002 draft "Guidelines for Maintaining Instream flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-California Coastal Streams" (DFG-NMFS Draft Guidelines) jointly developed by DFG and NMFS. (See Wat. Code, § 1259.4, subd. (b)) The DFG-NMFS Draft Guidelines were specifically developed to protect and restore anadromous salmonids and their habitat. The DFG-NMFS Draft Guidelines were intended to preserve a level of streamflow that protects anadromous salmonids from deleterious effects of water diversions. When the State Water Board developed the scientific basis for this policy, concepts proposed in the DFG-NMFS Draft Guidelines were utilized. Consideration of these concepts aided the State Water Board in developing criteria that are protective, as demonstrated in the Scientific Basis Report[2].

This policy establishes principles and guidelines for maintaining instream flows for the protection of fishery resources. It does not specify the terms and conditions that will be incorporated into water right permits, licenses, and registrations. It prescribes protective measures regarding the **season of diversion**, **minimum bypass flow**, and **maximum cumulative diversion**. Site-specific studies may be conducted to develop alternative site-specific protective criteria. The policy also 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. The policy 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. Enforcement requirements contained in this policy include a framework for compliance assurance, prioritization of enforcement cases, and descriptions of enforcement actions. The 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.

2.0 POLICY FRAMEWORK

2.1 Principles for Maintaining Instream Flows

Protection of fishery resources is in the public interest. The primary objective of this policy is to ensure that the administration of water rights occurs in a manner that maintains instream flows needed for the protection of fishery resources. This policy establishes the following five principles that will be applied in the administration of water rights:

1. Water diversions shall be seasonally limited to periods in which instream flows are naturally high to prevent adverse effects to fish and fish habitat;

[2] R2 Resource Consultants and Stetson Engineers, 2007a.

2. Water shall be diverted only when streamflows are higher than the minimum instream flows needed for fish spawning, rearing, and passage;

3. 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;

4. The cumulative effects of water diversions on instream flows needed for the protection of fish and their habitat shall be considered and minimized; and

~~5.~~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.

5.

The policy principles are implemented through the regionally protective criteria described in section 2.2.1 below, or the protective site-specific criteria described in section 2.2.2. In addition, the Board may approve alternative regional or site specific criteria.

2.2 Protective Instream Flow Criteria

The regional criteria (section 2.2.1) and the site specific studies (section 2.2.2) each utilize two flow thresholds.

The minimum bypass flow is a threshold important for managing the protection of two steelhead and salmon life history needs: (1) maintaining natural abundance and availability of spawning habitat; and (2) minimizing unnatural adult exposure, stress, vulnerability, and delay during adult spawning migration. It should be set at a level that accounts for all good habitat defined as individual sites with at least 15 ft2 for coho and 10 ft2 for steelhead. (I.e., increasing flow does not produce additional spawning locations with areas of those sizes.)

The winter low flow is the flow necessary to inundate riffles. It is a streamflow threshold important to managing several steelhead and salmon life history needs in small North Coast California streams: (1) maintaining good benthic macroinvertebrate habitat in riffles to foster high stream productivity, (2) preventing redd desiccation and maintaining hyphoreic subsurface flows, (3) sustaining high quality and abundant juvenile salmonid winter rearing habitat, and (4) facilitating smolt out-migration.

[These definitions should also appear in the Glossary.]~~Instream flow criteria may be required for proposed water diversions to comply with policy principles. The instream flow criteria used may either be the regionally protective criteria described below, or protective site-specific criteria developed by individual applicants or groups of applicants. Any site-specific criteria proposed by an applicant or group of applicants~~

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Comment [A1]: This statement is problematic without the language deleted from section 2.2. Specifically, the policy should make clear that before approving alternative regional criteria, the Board must comply with the provisions in the Water Code governing the adoption of and revisions to policy for water quality control. In addition, the scientific portion of any alternative regional criteria must undergo peer review.

Comment [A2]: Commenter clarified that the winter low flow threshold is intended for class II streams. Staff have not included this statement in the April 2010 revised draft policy so as to avoid confusion. The two flow thresholds, however are discussed throughout the policy.

Comment [A3]: R2 questioned whether the literature backs up these figures. It does.

Comment [A4]: This definition has been substantially placed in section 2.2.1.2 and Appendix C of the April 2010 revised draft policy.

Comment [A5]: This definition has been substantially placed in Appendix I of the April 2010 revised draft policy. Edits were made to reflect the winter low flow will be used for ... [1]

Comment [A6]: The deleted language has been retained in the April 2010 revised draft policy to allow for a narrative overview of the instream flow criteria. Limiting this se ... [2]

~~shall be consistent with the principles described in Section 2.1 and shall be approved by the State Water Board Deputy Director for Water Rights (Deputy Director). The site-specific study plan and documents supporting the basis for the criteria shall be reviewed and approved by the Deputy Director.~~

~~The State Water Board may approve alternative regionally protective criteria provided the Board finds that the alternative regional criteria are at least as protective of fishery resources as the criteria described below. Parties may petition the State Water Board to amend this policy to allow for alternative regional criteria. The Deputy Director shall review any petition submitted to determine if the proposed alternative regional criteria are scientifically sound. In making that determination, the Deputy Director shall consider whether the proposed alternative regional criteria are: (1) supported by scientific literature, (2) have been peer reviewed and found to be appropriate, and (3) have been validated at sites located in different geographic areas within the policy area. If the Deputy Director finds that the proposed regional criteria are scientifically sound, the State Water Board may amend the policy to allow for the regional application of alternative criteria. Before the State Water Board approves the alternative approach, it will comply with article 3 (commencing with section 13140) of chapter 3 of division 7 of the Water Code.~~

2.2.1 Regionally protective criteria

The policy area is a diverse region. Site specific studies would identify most accurately the fishery resource instream flow needs of a particular location. This policy also allows the use of criteria that were developed to be protective of fishery resources throughout the policy area[3] (regionally protective criteria or regional criteria). The intent of this approach is to provide the applicant an avenue for quicker processing of pending applications while protecting fishery resources. The regionally protective criteria should not be considered to have site-specific precision for every stream. The regional criteria are by necessity conservative and err on the side of resource protection. To be regionally protective, the regional criteria limit water diversions so that adequate flows are available at sites with the greatest instream flow needs. At some sites, therefore, more than adequate flows will be provided by regionally protective criteria. ~~Site specific studies may be used to identify more precisely the fishery resource instream flow needs of a particular location.~~

Comment [A7]: Language substantially included in April 2010 revised draft policy

2.2.1.1 Season of Diversion

The season of diversion is the calendar period during which water may be diverted. New diversions are generally not allowed using the regional criteria during the late spring, summer, and early fall because existing instream flows during this period generally limit anadromous salmonid rearing habitat quantity and quality in the policy area. The regionally protective criteria limit new water diversions in the policy area to a diversion season beginning on December 15 and ending on March 31 of the succeeding year. Site-specific studies may indicate that the season of diversion can be extended into other times of the year.

Comment [A8]: This is is already the case in the staff draft. (See small projects rules, which do allow some new diversions outside the regional criteria season of diversion.)

2.2.1.2 Minimum Bypass Flow and Winter Low Flow for Regional Criteria

Comment [A9]: This phrase was not included in the title for section 2.2.1.2 of the April 2010 revised draft policy that because the WLF will be defined for the protection of class II streams.

The minimum bypass flow is the minimum instantaneous flow rate of water that is adequate for ~~fish~~ anadromous salmonid spawning, rearing, and passage, as measured at a particular point in the stream.

With certain exceptions defined below, t~~T~~he minimum bypass flow must be met on an instantaneous basis at the **point of diversion** (POD) before water may be diverted using the regional criteria. The streamflow may naturally fall below the minimum bypass flow. A minimum bypass flow requirement generally prevents water diversions during periods when streamflows are at or below the flows needed for spawning, rearing, and passage.

Comment [A10]: There are exceptions in both the staff draft of the policy and our amendments. This edit merely reflects that fact.

The regionally protective criteria for the minimum bypass flow are determined using the **mean** annual flow and drainage area of the location being analyzed. The location of the diversion within the watershed is important to know before determining the minimum bypass flow. Diversions within the **range of anadromy** will use the mean annual flow

[3] For the scientific basis for the regionally protective criteria, see R2 Resource Consultants and Stetson Engineers, 2007a and 2009.

and drainage area at the diversion location to determine the minimum bypass flow. If the diversion is located within the range of anadromy, the size of the drainage area determines which formula in the table below should be used to determine the minimum flow needed for spawning, rearing and passage at the POD. The table below will also be used to assess instream flow needs at locations downstream of the POD. These locations are referred to as **points of interest** (POI). The drainage area at the POI determines which formula in the table below should be used to determine the minimum flow needed for spawning, rearing, and passage at each POI.

If a diversion is located above the **upper limit of anadromy**, the bypass flow at the diversion point is determined based on an evaluation of the effects of the proposed project at the upper limit of anadromy and at other POIs within the range of anadromy, rather than at the diversion location. Diversions located above the upper limit of anadromy may be able to operate without a minimum bypass flow if the evaluation of the effects of the proposed project demonstrates no impact to downstream fishery resources. Diversions on Class II and Class III streams are evaluated by reference to their cumulative effect on flows at the upper limit of anadromy and POIs downstream from there. The regional criteria require diversions on Class II streams to maintain a bypass flow equivalent to the **winter low flow** or greater. For further information regarding bypass flows for PODs above anadromy, please refer to Policy Section 2.3 and Appendix A Sections A.1.8.1 and A.1.8.2.

Comment [A11]: This edit clarifies terms already in the staff draft of the policy, although that draft does not give the winter low flow a name (other than February Median flow) or explain the rationale behind its use.

Comment [A12]: This language was substantially included in the April 2010 revised draft policy and rearranged to allow for more clarity

The regionally protective minimum bypass flow criteria at PODs and POIs located at and below the upper limit of anadromy are identified in the following table. The regionally protective minimum bypass flow criteria provide protective flows at the upper limit of anadromy and downstream.

Drainage Area at POD or POI	Minimum Bypass Flow Formula
1 square mile or smaller	$Q_{MBF} = 9.0\ Q_m$
Between 1 and 321 square miles	$Q_{MBF} = 8.8\ Q_m\ (DA)^{-0.47}$
321 square miles or larger	$Q_{MBF} = 0.6\ Q_m$

Q_{MBF} = **minimum bypass flow** in cubic feet per second
Q_m = **mean annual unimpaired flow** in cubic feet per second
DA = the **watershed drainage area** in square miles

The regionally protective criterion for the winter low flow is the February median flow.

Comment [A13]: This is already the case in the staff draft (see A.1.8.2 and A.1.8.3 and B.5.3.6), and it remains true in these amendments.

Methods for locating the upper limit of anadromy are provided in Appendix A Section A.1.4. The selection of POIs is described in Appendix A Section A.1.7. Guidelines for estimating the mean annual unimpaired flow, watershed drainage areas, and the

calculation of the regionally protective minimum bypass flow and February median flow are provided in Appendix B.

Comment [A14]: Again, this is the case in the staff draft.

2.2.1.3 Maximum cumulative diversion

Adequate magnitude and variability in peak streamflows are needed to meet the habitat needs of anadromous salmonids, including maintaining stream channel geometry, vegetative structure and variability, gravel and wood movement, and other channel features. In this policy these peak streamflows are called **channel maintenance flows**.

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 recurring on a periodic basis.

The **bankfull flow** is the flow at which channel maintenance is the most effective. The 1.5-year return peak flow is a hydrologic metric that can be used to estimate bankfull flow and effective channel maintenance flows. The **1.5-year instantaneous peak flow** is the annual maximum instantaneous peak streamflow that is equaled or exceeded, on average over the long term, once every one and a half years. The frequency at which this peak flow is expected to occur is referred to as the **recurrence interval**. Limiting the maximum rate at which water is withdrawn by all water diverters in a watershed so that peak streamflows are reduced by no more than a small fraction of the 1.5-year instantaneous peak flow will result in a relatively small change to channel geometry, and will ensure that natural flow variability and the various biological functions that are dependent on that variability are protected.

To ensure maintenance of natural flow variability and protection of the biological functions dependent on it, the maximum cumulative diversion rate is set at the largest value of the sum of the rates of diversion of all diversions upstream of a specific location in the watershed.

The maximum cumulative diversion rate regionally protective criterion is equal to: five percent of the 1.5-year instantaneous peak flow.

For projects located above anadromy, the maximum cumulative diversion rate criterion shall be evaluated at POIs at and/or below anadromy in order to identify the allowable rate of diversion at project PODs. The maximum cumulative diversion rate puts limitations on the cumulative rate of water withdrawal in a watershed, not necessarily the rate of withdrawal at a point of diversion. The rate of diversion for a project is not necessarily equal to the maximum cumulative diversion rate in a watershed. This is because the project's rate of diversion is based on an evaluation of whether the project, together with existing diversions, causes an exceedance of the maximum cumulative diversion rate criterion at points of interest at and/or below the upper limit of anadromy. Guidelines for calculating the maximum cumulative diversion rate criterion and for determining whether a limit on the rate of diversion is needed are provided in Appendix A, Section A.1.8 and Appendix B Section B.5.2.3.

2.2.2 Site-specific studies

~~If the diverter believes that the regional criteria are overly protective for a specific project, the diverter may propose site-specific criteria. The diverter may implement one or more of the regional criteria in combination with site-specific criteria.~~ Site-specific studies may be conducted to obtain site-specific criteria that identify more ~~precisely~~ accurately than the regionally protective criteria the instream flow needs of a particular location.

The following flow management objectives are approved for use as guidance for site-specific studies. The objectives define acceptable cumulative changes in stage when daily average flows are at different levels.

- When daily average flows exceed the minimum bypass flow defined in section 2.2, diversions shall cumulatively cause no more than 0.1 foot change in riffle stage.
- When daily average flows are between the minimum bypass flow and the winter low flow defined in section 2.2, diversions shall cumulatively cause no more than 0.05 foot change in riffle stage.
- When daily average flows are below winter low flows, diversions are not allowed except as defined in section 2.2 and Appendix A sections A.1.8.1 and A.1.8.2.

Appendix C describes the data and reporting requirements for the initial reconnaissance level habitat assessment, the development of the study plan from the results of the initial habitat assessment, and the reports documenting the results of a site-specific study.

An alternative site-specific approach may be proposed to develop criteria for parameters other than a minimum bypass flow, maximum cumulative diversion, or season of diversion. A description of the alternative approach and a study plan shall be submitted to the State Water Board for review and approval prior to commencement of field work and analysis.

The alternative approach and any proposed site-specific criteria shall be generally consistent with the principles described in Section 2.1. The State Water Board ~~may~~ shall consult with DFG regarding the alternative approach proposal, study plan, and study results. DFG shall be provided a reasonable period of time (not less than 30 days) to review and comment before the State Water Board provides the applicant with written recommendations.

All field work, analysis, and recommendations involving fishery habitat evaluations shall be performed by a qualified fisheries biologist.

Comment [A15]: Language substantially placed in appendix C of April 2010 revised draft policy

Comment [A16]: This language has been deleted in the April 2010 revised draft policy. Staff do not agree that allowing diversion below spawning flows is protective. Commenter has provided some clarification that this criteria was also built into their recommendations as a protective measure for class II streams. Staff have covered protection of class II streams through maintenance of the winter low flow. This concept is covered in the cumulative diversion analysis (appendix B) of the April 2010 revised draft policy.

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Comment [A17]: Concept included in the cumulative diversion analysis (appendix B) of the April 2010 revised draft policy

2.3 Assessment of the Cumulative Effects of Water Diversions on Instream Flows

The cumulative effects of water diversions on instream flows needed for the protection of fishery resources shall be considered and minimized. This policy requires the evaluation of whether a proposed water diversion project, in combination with existing diversions in a watershed, may affect instream flows needed for fishery resources protection. In addition, the State Water Board must find that unappropriated water is available to supply a proposed project prior to issuing a water right permit. (Wat. Code, § 1375, subd. (d).) This policy requires a water right applicant to conduct a water availability analysis that includes (1) a water supply report that quantifies the amount of water remaining instream after senior diverters are accounted for, and (2) a cumulative diversion analysis to evaluate the effects of the proposed project, in combination with existing diversions, on instream flows needed for fishery resources protection. Applicants may use regional criteria, site-specific criteria, or a combination of the two in the cumulative diversion analysis for assessing whether the proposed diversion affects the instream flows needed for fishery resources. The water supply report and cumulative diversion analysis are described in Appendix A, and guidelines for completing the analyses are provided in Appendix B.

Appendix A, Sections A.1.8.1 and A.1.8.2 specify ~~exemption~~ criteria for projects above the upper limit of anadromy. If the analysis shows a project can operate without a minimum bypass flow and maximum rate of diversion, or that it can operate with a bypass set to the winter low flow, and still be protective of fishery resources, the diverter may be able to operate without ~~the instream flow requirements prescribed~~ application of the regionally protective criteria for minimum bypass flow or rate of diversion established by this policy.

Comment [A18]: These edits are applicable to either the staff draft or the proposed amendments. They are suggested to improve clarity.

Comment [A19]: Language substantially included and revised for clarity in the April 2010 revised draft policy.

2.4 Onstream Dams

An onstream dam is a structure in a stream channel that impedes or blocks the passage of water, sediment, woody debris, or fish. Onstream dams can directly impact salmonids if they prevent fish passage and block access to upstream spawning and rearing habitats. Onstream dams can intercept and retain (1) spring and summer flows without providing bypass flows, (2) sediments/gravels that would otherwise replenish downstream spawning gravels, and (3) large wood that would otherwise provide downstream habitat structure. They also create slow-moving, lake-like habitats that can favor non-native species that either prey on anadromous salmonids or compete for food and shelter.

The following requirements minimize the impacts of onstream dams. The requirements avoid (1) causing individual or additive impacts to flows, (2) interrupting fish migratory patterns, (3) interrupting downstream movement of gravel, woody debris, or **aquatic benthic macroinvertebrate**s, (4) causing loss of riparian habitat or wetlands, or (5) creating habitat for non-native species. In addition to the following permitting requirements, water right applications for onstream dams shall also demonstrate that

water is available for diversion (see Appendix A). The following permitting requirements for onstream dams are dependent on the stream classification at the point of diversion. For purposes of this Policy, the stream shall be classified in accordance with the stream classification system described in Appendix A Section A.1.6. Class I streams are streams where fish are always or seasonally present. Class II streams are streams where fish are not present, but **aquatic non-fish vertebrates** and /or aquatic benthic macroinvertebrates exist. Class III streams do not support aquatic life.

2.4.1 Onstream dams on Class I streams

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

1. The applicant provides documentation acceptable to the State Water Board that the onstream dam was built prior to July 19, 2006. This is the date the public notice of preparation of the policy was issued. One year after the adoption of this policy, water right applications for onstream dams built prior to July 19, 2006 within the affected policy area will no longer be accepted.

2. Fish passage facilities are constructed in accordance with requirements provided by DFG in a written certification. If DFG determines that fish passage facilities are not needed, this determination and DFG's supporting reasons shall be provided. The applicant shall provide a copy of the DFG certification to the State Water Board during the environmental review of the application or petition.

3. The applicant signs an agreement to comply with all conditions, including but not limited to, conditions upon the construction and operation of the fish passage facilities, required by DFG.

4. A passive bypass system or automated computer-controlled bypass system is constructed that conforms with the requirements contained in Appendix E.

5. Fish screens are installed in accordance with the requirements contained in Section 6.0.

6. Where needed, mitigation plans for non-native species eradication, gravel and wood augmentation, and/or riparian habitat replacement are developed and implemented. Guidance for developing mitigation plans is provided in Appendix D.

2.4.2 Onstream dams on Class II streams

With the exception below, the State Water Board will not approve a water right permit for a proposed or existing onstream dam on a Class II stream unless the following requirements are met:

1. The applicant provides documentation acceptable to the State Water Board that the onstream dam was built prior to July 19, 2006. This is the date the public notice of preparation of the policy was issued. One year after the adoption of this policy, water right applications for onstream dams built prior to July 19, 2006 within the affected policy area will no longer be accepted.

2. A passive bypass system or automated computer-controlled bypass system, is constructed that conforms to the requirements contained in Appendix E.

3. Where needed, mitigation plans for non-native species eradication, gravel and wood augmentation, and/or riparian habitat replacement are developed and implemented. Guidance for developing mitigation plans is provided in Appendix D.

Notwithstanding requirements number 1 and 2 above, the State Water Board may consider approving a water right permit for a proposed onstream dam on a Class II stream if all of the following conditions are met:

1. 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.

2. The existing permitted or licensed reservoir was constructed prior to the adoption of this policy and does not have fish passage facilities, and DFG has provided a written determination that it is not feasible to construct fish passage facilities.

3. The applicant prepares and submits a biological assessment demonstrating that the proposed dam will not adversely affect fish between it and the existing permitted or licensed reservoir.

4. The applicant develops and implements mitigation plans for non-native species eradication, gravel and wood augmentation, and/or riparian habitat replacement, where needed. Guidance for developing mitigation plans is provided in Appendix D.

5. The applicant prepares and submits evidence demonstrating that the proposed diversion will not adversely affect instream flows needed for fishery resources downstream of the existing permitted or licensed reservoir that provides municipal water supply or is under the jurisdiction of the Federal Energy Regulatory Commission.

2.4.3 Onstream dams on Class III streams

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

1. A passive bypass system, or automated computer-controlled bypass system, is constructed that conforms with the requirements contained in Appendix E, or there is a determination pursuant to Appendix section 1.8.1 that no bypass flow is needed.

2. Mitigation plans for non-native species eradication, and gravel and wood augmentation, are developed and implemented, where needed. Guidance for developing mitigation plans is provided in Appendix D.

Comment [A20]: This is true in both the staff draft and the proposed amendment.

3.0 POLICY APPLICABILITY

3.1 Instream Biological ~~Fishery~~ Resources Covered by the Policy

This policy establishes principles and guidelines for maintaining instream flows for the protection of native fishery resources in Northern California coastal streams. Many of t~~T~~he criteria in this policy were developed based on the requirements of anadromous salmonids~~, which are among the largest native fish in the policy area~~ present within the policy area. The policy focuses on i~~I~~nstream flows that satisfy the needs of anadromous salmonids because these fishes are widely distributed across the policy area and because these instream flow requirements are generally ~~will also be~~ protective of ~~smaller~~ other native fish populations and fish habitat ~~in general~~. The principles and guidelines in this policy shall not apply where they conflict with the requirements for other instream biological resources.

Comment [A21]: Language substantially included and revised for clarity in the April 2010 revised draft policy.

3.2 Geographic Area Covered by the Policy

This policy applies to water diversions from all streams and tributaries discharging to the Pacific Ocean from the mouth of the Mattole River south to San Francisco, and all streams and tributaries discharging to northern San Pablo Bay. The policy area includes approximately 5,900 stream miles and encompasses 3.1 million watershed acres (4,900 square miles) in Marin, Sonoma, portions of Napa, Mendocino, and Humboldt counties, as indicated on Figure 1. Information from the USGS National **Hydrography** Database was used to create a list of named streams within the policy area, as provided in Appendix K. The policy applies to water diversions from these streams and to water diversions from unnamed and locally named streams that contribute flow to these streams.

The regionally protective instream flow criteria for season of diversion, minimum bypass flow, maximum cumulative diversion, and the cumulative diversion analysis requirements do not apply to water diversions from **flow regulated ~~mainstem~~ rivers**. However, diversions from these streams shall comply with the rest of this policy, including the policy principles and the regionally protective criteria pertaining to onstream dams. Diversions from streams tributary to flow regulated ~~mainstem~~ rivers shall comply with all aspects of this policy

Comment [A22]: If you delete the word "mainstem," how do you distinguish between flow-regulated rivers and their tributaries?

Comment [A23]: The phrase "mainstem" has been retained in the April 2010 revised draft policy.

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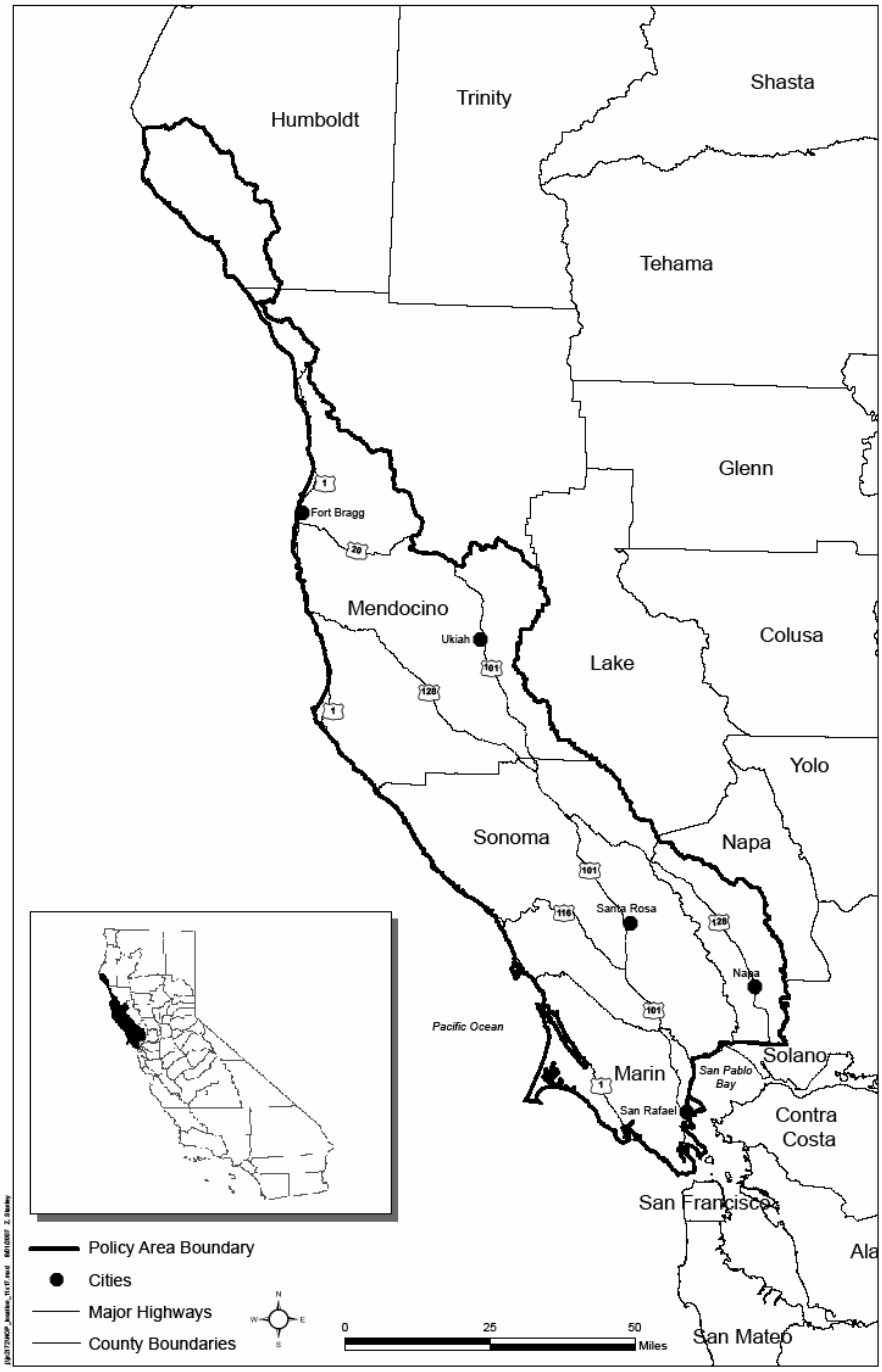

Figure 1 Geographic Area Affected by the Policy

3.3 Water Right Actions Covered by the Policy

This policy applies to applications to appropriate water, small domestic use and livestock stockpond registrations, and water right petitions. Enforcement requirements include a framework for compliance assurance, prioritization of enforcement cases, and timely and appropriate enforcement actions. Information regarding enforcement can be found in Policy Section 9.0 and Appendices F, G, and H

3.3.1 Water right applications

Except as provided below, this policy applies to applications to appropriate water from surface water streams or from subterranean streams flowing through known and definite channels.

Applications filed with the State Water Board prior to the adoption date of this policy shall be processed as follows:

1. If prior to the adoption date of this policy, the applicant has submitted a water availability analysis and an analysis of cumulative flow-related impacts the State Water Board will process the water availability aspects of the application using the DFG-NMFS Draft Guidelines. Prior to processing the application using the DFG-NMFS Draft Guidelines the State Water Board must determine that the project is consistent with the recommendations contained therein pertaining to diversion season, onstream dams, minimum bypass flows, protection of the natural hydrograph and avoidance of cumulative impacts. Projects in the process of implementing site specific study plan(s) that have been approved by DFG, NMFS, and the State Water Board meet this requirement. All other aspects of this policy will apply.

2. If the applicant has submitted a water availability analysis and an analysis of cumulative flow-related impacts prior to the adoption date of this policy, and the State Water Board determines that the project is not substantially consistent with the recommendations contained the DFG-NMFS Guidelines, then all of the requirements of this policy shall apply.

3. If a water availability analysis and an analysis of cumulative flow-related impacts have not been submitted prior to the date this policy was adopted, all of the requirements of this policy shall apply. The applicant, however, may request and the Deputy Director for Water Rights may approve continued processing of the application consistent with the DFG-NMFS Draft Guidelines if the Deputy Director for Water Rights finds that an applicant has completed significant work towards the analyses prior to the adoption of this policy.

4. If prior to the adoption of the policy, the State Water Board has circulated for public review a negative declaration, mitigated negative declaration or environmental impact report pursuant to the California Environmental Quality Act,

the Board may continue processing the application without applying the ~~regionally protective~~ criteria contained in Section 2.2~~.1~~.

~~The Deputy Director may approve an exception to the season of diversion criterion for all or part of an application if the application is for a storage project and the Deputy Director finds that (1) the applicant's existing diversions under another valid basis of right will be reduced as a result of the applicant's ability to divert to storage, and (2) the benefit to fishery resources of the reduction in diversions outweighs the potential impacts to fishery resources of the storage project.~~

Comment [A24]: This is not a deletion but a move (into the section about making beneficial changes).

Comment [A25]: Staff retained this language in both sections of the revised April 2010 draft policy because it applies to applications and (as commenter suggests) possibly to petitions.

3.3.2 Water right petitions

Under this policy, a petitioner shall provide adequate information for the State Water Board to determine whether the proposed change will affect instream flows.

3.3.2.1 Petitions that will not result in decreased flow in a stream reach

The policy requirements for diversion season, minimum bypass flow, and maximum cumulative diversion do not apply to petitions that do not result in decreased flow in a stream reach.

Petitions that do not result in decreased flow in a stream reach but involve moving or adding an onstream dam shall comply with the permitting requirements for onstream dams contained in Policy Section 2.4.

3.3.2.2 Petitions for short-term change

The policy requirements for diversion season, minimum bypass flow, and maximum cumulative diversion do not apply to petitions to change existing water right permits and licenses effective for one year or less, e.g., petitions pursuant to section 1435 *et seq.* and section 1725 *et seq.*

Comment [A26]: A modified version of this language has been included in the April 2010 revised draft policy to fit within requirements of the Water Code.

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3.3.2.~~2~~3 Petitions that may result in decreased flow in a stream reach

Approval of a petition for change or extension of time may result in an incremental increase in the amount of water diverted as compared to the amount of water that would be diverted if the petition were denied. For permits, the incremental increase is equal to the full **face value** of permit minus the amount of water put to beneficial use in compliance with all existing permit conditions. Because water right licenses are limited to the amount of water actually put to beneficial use during the permit development schedule, approval of a change petition filed on a license will not result in an incremental increase in the amount of water diverted.

However, some petitioned changes may result in changes in flow of a particular stream reach, particularly those changes that affect the location of a point of diversion or those that result in a change in the timing or location of return flows from the approved use.

Any increase in diversion or reduction in return flows corresponds to a decrease in streamflow. The incremental decrease in streamflow resulting from the approval of a petition shall be evaluated for adverse effects to fish and wildlife using the cumulative diversion analysis instream flow assessment methods established in this policy. The results of the evaluation may be used to develop terms and conditions for amended permits and licenses. Only the stream reaches potentially affected by the proposed change need be evaluated. The evaluation shall consider the effect of the proposed change on instream flows needed for fishery resources at locations where anadromy exists, after consideration of the flow reductions caused by all authorized diverters.

3.3.2.~~43~~4 Voluntary modification of authorized diversions for the enhancement of fish and wildlife resources

Persons who divert water under any legal basis of right, including riparian and permitted and licensed water rights, may petition the State Water Board pursuant to Water Code section 1707 for a "change for purposes of preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation in, or on, the water." The section 1707 petition may be coupled with an application for a water right or a petition to amend an existing permit or license in order to modify an existing project so that diversion will occur in a manner that minimizes impacts to fish and wildlife. For example, a riparian right holder may file an application for offstream winter storage in lieu of summertime riparian direct diversion coupled with a petition to dedicate riparian flows under section 1707.

The Deputy Director may approve an exception to one or more of the diversion criteria for all or part of an application if the application is for a storage project and the Deputy Director finds that (1) the applicant's existing diversions under another valid basis of right will be reduced as a result of the applicant's ability to divert to storage, and (2) the benefit to fishery resources of the shift in timing of diversions outweighs the potential impacts to fishery resources of the storage project.

Other changes that result in enhanced conditions for fish and wildlife may include:

1. removal of an artificial barrier to the migration of anadromous fish;
2. replacement of onstream storage with offstream storage;
3. relocation of a point of diversion to reduce impacts to aquatic resources;
4. changes to frost protection practices undertaken pursuant to an existing water right that improve habitat for aquatic resources (which could include moving a point of diversion, adding or expanding storage in order to reduce instantaneous demand during frost events, improving efficiency, or implementing alternative frost protection techniques); and
5. other activities that have the effect of creating fish and wildlife habitat with improved streamflows.

The Deputy Director may approve an exception to one or more of the diversion criteria for projects that include enhanced conditions specified above if the Deputy Director

finds that the project as a whole provides a net benefit to instream flows and serves the public interest.

The State Water Board will also expedite, where feasible, processing of petitions that will result in enhanced conditions for fish and wildlife, including section 1707 petitions and any water right applications or petitions to amend existing permits or licenses that accompany them. Expedited water right processing may occur if the following conditions are met:

1. Documentation is provided showing the change will enhance conditions for fish and wildlife, including proof of past riparian use, if relevant;

2. The petitioner or applicant consults with other agencies, including DFG, NMFS, the Regional Water Quality Control Boards, and other agencies with jurisdictional authority, and the agencies provide written approval or support for the proposed change;

3. The proposed change is consistent with the principles of this policy; and

4. For water right applications, (1) a water availability analysis is submitted pursuant to Water Code section 1375, subdivision (d) that takes into account the **face value demand** of all known **senior diversions**, including senior pending water rights, and (2) the applicant agrees to conditions of approval that will ensure that the water that is the subject of the section 1707 petition will remain instream for purposes of protecting wetlands habitat, fish and wildlife resources, or recreation in or on the water.

3.3.3 Small domestic use and livestock stockpond registrations

A person can obtain a right to appropriate water for a small domestic or livestock stockpond use by registering the use with the State Water Board. (Wat. Code, § 1228 et seq.) A registration of water use must include a certification that the registrant agrees to comply with all conditions required by DFG, including conditions on the construction and operation of the diversion work. (*Id.,* §1228.3, subd. (a)(7).) An appropriation pursuant to a registration within the policy area is subject to the following conditions:

1. No water may be stored or diverted under the registration by means of an onstream dam constructed on a Class I or Class II stream after July 19, 2006.

2. DFG imposes conditions consistent with the principles of this policy that are stated in Section 2.1. DFG's authority to impose conditions on small domestic use and livestock stockpond use registrations includes, but is not limited to, the authority to impose bypass flow conditions and monitoring during all or a portion of the authorized season of diversion.

Comment [A27]: This language was not included in the April 2010 revised draft policy because the concept is repetitive with the preceding commenter suggestion (which has been placed in two different sections of the April 2010 revised draft policy).

3.3.4 Application of Diversion Criteria to Applications and Petitions from Certain Streams

The policy requirements for diversion season, minimum bypass flow, and maximum cumulative diversion shall be considered when appropriate for but shall not be binding on applications and petitions from the following:

1. Streams that do not support anadromous salmonids and that do not contribute streamflow to salmonid-bearing streams;
2. Streams bearing native instream biological resources whose requirements conflict with the requirements of anadromous salmonids; or
3. Streams or diversions for which the board has adopted an order or decision balancing instreams and non-instream resources.

3.4 Review Procedures for Water Right Applications and Petitions

3.4.1 Application and Petition Processing

This policy establishes new procedures for Division processing of water right applications, petitions, and registrations defined in section 3.3. Unless otherwise stated, this section shall refer generally to water right application, petition, and registration as "application", and applicant, petitioner and registrant as "applicant". The new procedures in this policy are consistent with and complimentary to existing procedures defined in the Water Code and Code of Regulations. Application process flow charts are provided in Appendix L.

3.4.2 General Procedures Applicable to All New and Amended Applications

3.4.2.1 Project Scoping Conference for New and Amended Applications

The applicant and Division staff shall have an early conference to discuss the scope of the application, the required environmental and water availability analyses, and the analytic methodologies for those analyses (within 60 days of application filing). This procedure shall apply to new applications and for amended applications.

3.4.2.2 Application Work Plan

The applicant and Division staff shall mutually develop a work plan within 60 days from the project scoping conference. The work plan shall delineate the major tasks necessary to process the application and clearly delineate the respective responsibilities of the applicant, the consultants, and Division staff.

3.4.2.3 Early Consultation with Protestants and Responsible Agencies

The applicant and SWRCB staff shall have an early consultation conference with protestants and responsible agencies to exchange basic information about the project and concerns with the project. Early consultation may occur through in-person meetings or telephone conversations. Applicants, protestants, and responsible agencies are encouraged to arrange a site visit and to confer regarding the application work plan.

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Comment [A28]: This section was not included in the April 2010 revised draft policy because the concepts have already been included or implied elsewhere in the policy (see following comments for specifics).

Comment [A29]: This concept is implied elsewhere in the April 2010 revised draft policy.

Comment [A30]: This concept is included elsewhere in the April 2010 revised draft policy (specifically in edits to section 3.1)

Comment [A31]: This concept is included elsewhere in the April 2010 revised draft policy (specifically in section 3.2 and appendix I).

Comment [A32]: This language has been substantially included in the April 2010 revised draft policy.

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3.4.2.3 Draft Permits and Change Petitions

The Division shall provide applicants, protestants, and responsible agencies with a draft permit or change petition before it makes a final decision on the permit or petition, and provide a reasonable time to comment.

3.4.3 Environmental Review Procedures Applicable to all Processing Strategies

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3.4.3.1 Environmental Impact Analyses

1. Coordination of Environmental Analyses. Applicants within a watershed shall coordinate the water availability, CEQA and/or public trust analyses where feasible.

2. Impact Assessment Criteria and Study Guidelines. Section 5 of policy establishes narrative criteria, numeric criteria, and study methodologies for salmonid resources. The Division shall develop guidelines for environmental impact analyses (including narrative criteria, numeric criteria where applicable and available and study methodologies) for non-salmonid resources including non-salmonid aquatic resources (such as amphibians and warm water fishes) and terrestrial resources, for assessing the effects of onstream dams, and similar resource issues.

   A narrative criterion is a description of the desired biological or hydrological condition to be protected or impact to be avoided, such as the minimum stream flow necessary to maintain salmonid spawning below the point of diversion. The criteria should be tailored to address the specific features of projects within the region and the potential impacts caused by those projects. The criteria should function to screen smaller projects with lesser impacts into an expedited review process from larger projects with greater effects into a more involved evaluation process.

Comment [A33]: This sounds a lot like CEQA thresholds of significance, which must be adopted as regulations. (See Cal. Code Regs., tit. 14, section 15074.7.)

Comment [A34]: This language was not included in the April 2010 revised draft policy because of a possible legal issue (see comment DCH33).

3. Model Environmental Analyses. The Division shall maintain a library of model environmental analyses that represent a reasonable range of water diversions (e.g., onstream storage, diversion to offstream storage, direct diversion, etc.), affected biological resources (e.g., salmonid fishes, non-salmonid fishes, amphibians, etc.), watershed size, and clear impact assessment methodologies or thresholds.

4. Scale of Analyses. The water availability, CEQA and public trust analyses shall consider relevant watershed-scale issues wherever possible.

3.4.3.2 Options for Retention of Consultants for Projects Where the State Water Board is Lead Agency

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The State Water Board may employ one of the following arrangements or a combination of them for preparing a draft environmental analysis listed in CEQA Guidelines section (Cal. Code Regs., tit. 14, § 15084):

1. Preparing the draft environmental analysis directly with its own staff.
2. Contracting with another entity, public or private, to prepare the draft environmental analysis.

3. Accepting a draft prepared by the applicant, a consultant retained by the applicant, or any other person.
4. Executing a third party contract or memorandum of understanding with the applicant to govern the preparation of a draft environmental analysis by an independent contractor.
5. Using a previously prepared environmental analysis.

Before using a draft prepared by another person, the lead agency (State Water Board) shall, as required by the Guidelines, subject the draft to its own review and analysis. The draft environmental analysis which is sent out for public review must reflect the independent judgment of the lead agency. The lead agency is responsible for the adequacy and objectivity of the draft environmental analysis. (Cal. Code Regs., tit. 14, § 15084.)

Where a new environmental analysis is required and the State Water Board requires the cost of the analysis to be borne by the applicant, in most cases the applicant may elect to prepare a draft environmental analysis or contract with another entity to prepare the draft (option 3) or execute a memorandum of understanding (MOU) for preparation by an independent contractor (option 4).

The applicant may be required to enter into an MOU (option 4) where the project involves matters of significant policy, legal or technical concern for the State Water Board.

3.4.4 Pre-decisional Review - Trial Program

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The Division shall establish a trial program that provides an opportunity for applicants and protestants to appeal to an appointed Member of the Board before final action on the application, petition or registration is taken by the Board on Division staff determinations including but not limited to following issues:

1. Whether the diversion is from a natural watercourse subject to the permitting jurisdiction of the Board;
2. Whether the project involves diversion of water subject to the permitting jurisdiction of the Board;
3. Whether the application is subject to CEQA, or is subject to CEQA, but categorically exempt from further analysis;
4. Whether a CEQA document satisfies the requirements of CEQA;
5. Whether a water availability analysis satisfies the requirements of the Water Code and this policy;
6. Whether a protest shall be accepted or rejected, or dismissed.

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Where applicants and protestants have been unable to settle a protest by the time the Division is ready to make a decision on the proposed application, the Division shall provide them an opportunity to propose competing draft Division Decisions for the Division's consideration.

4.0 WATERSHED-BASED APPROACHES

Comment [A35]: The commenter suggested edits to section 4 have been substantially included in the April 2010 revised draft policy

The State Water Board recognizes that a watershed approach for determining water availability and evaluating environmental impacts of multiple water diversions in a watershed may be an alternative to evaluating individual projects using the regionally protective criteria set forth in this policy. Accordingly, flexibility should be provided to groups of diverters who endeavor to work together to allow for cost sharing, real-time operation of water diversions, and implementation of mitigation measures, as long as the proposed approaches are consistent with the principles for maintaining instream flows provided in section 2.1.

The policy encourages two alternative forms of watershed-based approaches: coordinated management of diversions through watershed charters (sections 4.1-4.6) and coordinated permitting of applications (section 4.7).

The watershed charter approach involves the formation of watershed groups to coordinate the development of technical information for coordinated water right permitting and/or for the coordination of diversion operations. Coordinated water right permitting allows the use of one package of technical documents for all pending applications within the watershed group. Coordinated operation of diversions and implementation of mitigation measures may be proposed through diversion management plans. Depending on the water right priority of the projects involved in a watershed group, participants in a watershed approach may receive expedited environmental review of water right applications. Individual water right permits will be issued for any approved applications that are part of a watershed group, provided that individual applicants accept permit conditions.

4.1 Definition of a Watershed Charter Group

Comment [A36]: Clarified Watershed "Charter" Group to avoid confusion and hard feelings with all of the other "watershed groups" out there.

A watershed charter group consists of participants who enter into a formal project charter to develop technical documents to provide the information needed for coordinated processing of all the pending applications in the watershed group, and to develop a diversion management plan if coordination of diversions and implementation of mitigation measures is desired.

4.2 Project Charter

Water right applicants that choose to form a watershed group shall submit a proposed project charter to the State Water Board. The purpose of the charter is to ensure that watershed group participants are in agreement regarding the goals of the group and the tasks that must be completed to achieve these goals. The charter shall contain watershed group participant names, roles, and responsibilities, and a description of the individual water right applications or petitions involved. It shall also describe the key contents of the technical documents that will be prepared by the watershed group, and include an estimated schedule for submitting these documents to the State Water Board. It shall also contain information demonstrating that the participants in the

watershed group make the financial commitment to perform the tasks and achieve the listed goals.

In addition to water right applicants, watershed group participants may include existing diverters under other claims of right (appropriative, riparian, pre-1914, etc.), regulatory agencies, conservation groups, other community groups, and other stakeholders who have direct interests or capacity to contribute to the goals and tasks of the watershed group. The number of participants and the size of the watershed involved in each watershed group shall be subject to the State Water Board review and approval.

The State Water Board must review and concur with the proposed watershed project charter before the watershed group commences work. The State Water Board will consider the extent of participation from applicants and petitioners relative to the total number of pending applications and petitions in a watershed as one factor in deciding whether to approve the proposed project charter. The State Water Board may consult with DFG regarding the project charter. If consulted, the DFG shall be provided a reasonable period of time (not less than 30 days) to review and comment on the project charter. Watershed groups already operating prior to policy adoption may participate in the watershed approach provided they are willing to comply with the other requirements of this policy.

4.3 Required Technical Documents

The watershed group shall provide the technical information necessary for the State Water Board to (1) determine water availability, (2) satisfy the requirements of CEQA (if applicable), (3) evaluate the potential impacts of water appropriation on public trust resources, (4) make decisions on whether and how to approve pending water right applications for diverters in the watershed group, and (5) make decisions on whether to approve proposed diversion management plans.

The watershed group shall perform technical work and submit technical documents as described below:

1. Site-specific studies. The watershed group shall perform site-specific studies evaluating the instream flow needs of fish and fish habitat using the site-specific study guidance contained in Appendix C of this policy. After study completion, the watershed group shall submit a report detailing the results of the study to the State Water Board for review and approval. DFG consultations may occur, consistent with the provisions of Appendix C.

2. Environmental documents. The watershed group shall submit information necessary to prepare appropriate environmental documents so that the State Water Board may make a determination of the impacts of the proposed projects to the environment, public trust, and the public interest for the purposes of

preparing water right permits for the proposed projects. At a minimum, this information shall include (1) an evaluation of water availability, (2) descriptions of the significance of the potential impacts of the proposed projects caused by reductions in streamflow and/or the presence of onstream dams, (3) descriptions of proposed mitigation measures for impacts identified as potentially significant, (4) information needed for draft initial studies or other CEQA documents, and (5) an evaluation of the potential impacts of the proposed projects on public trust resources. All documents are subject to State Water Board review and approval. The analysis of water availability shall take into consideration diversions by member diverters and non-member diverters in the watershed. The watershed group shall work with regulatory agencies, as necessary, including NOAA Fisheries, the US Army Corps of Engineers, DFG, the State Water Board, and the North Coast Regional Water Quality Control Board to obtain regulatory approvals, assurances and/or permits under the ESA and CESA and state and federal water quality laws and regulations. CEQA and other environmental reviews of pending applications in the watershed group shall be coordinated to the extent possible. Technical documents prepared by the watershed groups shall be considered elements of the pending applications and, along with the applications, shall be subject to public notice and review and comment by responsible agencies and the public.

3. Diversion Management Plans. Diversion management plans shall be prepared if the watershed group proposes to coordinate operation of diversions and/or implementation of mitigation measures. Diversion management plans are not needed if the watershed group proposes only to coordinate the development of technical information for the permitting process. Watershed management plans shall describe: (a) how diversions will be operated to achieve compliance with streamflow requirements for the protection of fishery resources developed in item 1, above; (b) how diversions will be monitored to demonstrate compliance is achieved, including monitoring and reporting methods; and (c) the mitigation measures that will be implemented, a time schedule for implementation, and how the watershed group will ensure that such measures are implemented.
The diversion management plan shall include a certification that the watershed group has the financial resources to build, operate, maintain, and monitor the proposed projects consistent with the terms of any water right permits issued for the project(s) and shall provide proof of financial resources.

   Diversion management plans shall be consistent with the general requirements of this policy and all appropriate federal, state, and local laws. The diversion management plan shall not propose actions that result in any diminishment of the State Water Board's authority to require or enforce conditions to protect fish and wildlife, other public trust resources, or senior water right holders. Diversion management plans are subject to State Water Board review and approval, and may be incorporated as enforceable terms and conditions in State Water Board orders, decisions, permits, or licenses.

4.4 Approval of Technical Documents

The State Water Board shall review and approve the technical documents before issuing water right permits or approving petitions. The DFG may be consulted regarding any of the technical documents. If consultation occurs, DFG shall be provided a reasonable period of time, not less than 30 days, to review and comment.

4.5 Water Right Permit and License Terms

Individual water right permits and licenses may be issued for any projects with approved applications or petitions that participate in the watershed group. If diversion management and/or mitigation measure implementation will be coordinated with other diversions, additional terms shall be included within each permit or license that describe the operational requirements of each diversion during the period of time the project charter is in effect. The permits or licenses shall also include terms describing the operational requirements of the diversions and/or mitigation measures if the project charter were to be retracted or dissolved.

In addition to standard or special water right permit and license terms, water right permits and licenses for watershed groups operating under a watershed management

plan shall contain special terms designed to assess the effectiveness of the watershed management plan in meeting the requirements of this policy.

4.6 Retraction of State Water Board Approvals

The State Water Board may retract its approval of a watershed group, project charter, and/or diversion management plan, or direct watershed group participants to comply with a time schedule, if the watershed group does not perform its obligations as specified in the project charter or diversion management plan in a timely manner.

4.7 Coordinated Permitting

In some circumstances, it may be desirable for groups of applicants to coordinate permitting even where formation of a watershed charter group is not practical. The State Water Board encourages applicants, on their own initiative, to coordinate in the development of technical information and hearings on project applications and petitions to better understand and mitigate cumulative effects.

4.7.1. Technical Information

Applicants in a given watershed are encouraged to coordinate the development and submittal of water availability analyses, environmental impact assessments, and other technical information needed for State Water Board's determination of the impacts of the proposed projects on senior right holders, the environment, the public trust, and the public interest.

4.7.2. Application Review and Hearing

Applicants in a watershed are encouraged to propose coordinated review and hearings on their applications and petitions to promote efficient resolution of common issues of law and fact.

Comment [A37]: This section was not included in the April 2010 revised draft policy because it appears to be repetitive

5.0 BYPASS SYSTEMS, FLOW MONITORING, AND REPORTING

This section details the bypass system requirements, monitoring, and reporting necessary for showing compliance with minimum bypass flow requirements. Additional flow and diversion monitoring ~~may be needed to comply with other water right terms and conditions placed in permits and licenses, including monitoring to demonstrate compliance with maximum rate of diversion requirements~~and reporting requirements are described in section 10.~~.~~

Minimum bypass flow and maximum rate of diversion permit terms imposed pursuant to this policy shall be met on an instantaneous basis. To ensure compliance with these requirements, all diversions under this policy shall operate using passive bypass systems, with the following exception: Upon State Water Board approval, if physical site conditions ~~prevent the~~ make construction of a passive bypass system impracticable,

Comment [A38]: This language has been revised back to read "prevent the" in the April 2010 revised draft policy in order to limit alternatives only to situations based on physical site conditions

an ~~automated computer-controlled~~ alternative bypass system ~~shall~~ may be designed, installed, and operated. The requirements of passive and computer-automated bypass systems are described in Appendix E.

5.1 Bypass Flow Monitoring and Reporting Requirements for Passive Bypass Systems

Bypass flow monitoring at the POD is not necessary for passive bypass systems, but all permittees and licensees are required to participate in the regional stream flow monitoring program defined in section 10. ~~However, p~~Permittees and licensees who are required to have passive bypass systems shall annually prepare a signed statement, with photographic evidence, certifying that the passive bypass system is still operational as designed. This certification shall be submitted with Permittee Progress Reports, Reports of Licensee, or whenever requested by the State Water Board.

Comment [A39]: Language substantially included, but reorganized for clarity in April 2010 revised draft policy.

5.2 Bypass Flow Monitoring and Reporting Requirements for ~~Automated Computer-Controlled~~ Other Bypass Systems

If an ~~automated computer-controlled~~ alternate bypass system is implemented, compliance with the minimum bypass flow, ~~-~~rate of diversion, and season of diversion requirements (as applicable) shall be demonstrated by ~~hourly~~ continuous recording using automated flow measuring device(s) at the bypass outlet, reservoir stage, stream temperature at the outlet, and withdrawals from the reservoir. The ~~flow~~ data shall be recorded on an hourly (or more frequent) basis so that it is retrievable and viewable using commonly available computer software. The flow data shall be submitted electronically in a spreadsheet format usable by MS Excel or a similar software program. The hourly data shall be presented both graphically and numerically for the previous reporting period, and shall be submitted with Permittee Progress Reports, Reports of Licensee, or whenever requested by the State Water Board.

Comment [A40]: Language substantially included with edits for clarity and to broaden scope to include water quality control board recommendations in April 2010 revised draft policy.

6.0 FISH SCREENS AT DIVERSIONS IN CLASS I STREAMS

Fish screens shall be installed at diversions on Class I streams that include direct diversions, diversions to offstream storage, and onstream dams with fish passage facilities, with the following exceptions: Fish screens are not required on **offset wells** or **Ranney collectors**.

NMFS screening criteria shall be used to design the fish screening facilities. The NMFS screening criteria can be found in "Fish Screening Criteria for Anadromous Salmonids", which may be obtained from the NMFS website at *http://swr.nmfs.noaa.gov/hcd/fishscrn.pdf*. Hard copies of the document are available from the NMFS Southwest Regional Office.

The applicant or petitioner may request the State Water Board to waive the fish screen requirement. Prior to consideration of this request, the applicant or petitioner shall

provide the State Water Board a written determination with supporting rationale from DFG that fish screens are not needed.

7.0 COMPLIANCE PLANS

Applicants and petitioners shall submit a compliance plan for State Water Board's review and approval, prior to the issuance of a permit. The compliance plan shall identify how the water diverter will comply with the terms and conditions of permits or licenses, and shall include a schedule for the construction of facilities and the implementation of mitigation plans where needed. The compliance plan shall be prepared by a qualified person and is subject to approval by the State Water Board.

Comment [A41]: Language not included in April 2010 revised draft policy because it does not appear to be consistent with the permitting process timeline.

8.0 ENFORCEMENT

Timely and appropriate enforcement is critical to the successful implementation of the policy and to ensure that instream flows in north coast streams are maintained. This section of the policy provides guidance in the exercise of the State Water Board's enforcement discretion by establishing a framework for (1) identifying and investigating instances of noncompliance, (2) taking enforcement actions that are appropriate in relation to the nature and severity of the violation, and (3) prioritizing enforcement resources to achieve maximum environmental benefits and compliance with the policy. It also provides notice to the regulated community of the State Water Board's intent to enforce the policy and the methods of enforcement. It is not intended to provide support for any defense raised in response to an enforcement action.

8.1 Compliance Assurance

For compliance assurance, there must be a clear understanding of the requirements that implement this policy and a subsequent review of compliance with those requirements. The State Water Board will assure compliance with this policy by developing clear and enforceable permit terms and conditions, requiring and reviewing compliance plans, reviewing self-monitoring reports, and maintaining a field presence in the policy area through compliance inspections, licensing inspections and complaint investigations. For further details regarding methods of compliance assurance, see Appendix F.

8.2 Prioritization of Enforcement

Every violation merits an appropriate enforcement response. The State Water Board will balance the need to complete its non-enforcement tasks with the need to address violations. It must also balance the importance or impact of each potential enforcement action with the cost of that action. Informal enforcement actions, described below, have been the most frequently used enforcement response. Such informal actions will continue to be part of this policy for low priority violations. Formal enforcement actions

are resource-intensive and must therefore be targeted to the highest priority violations. Some violations, although they may have a low impact individually, may have systemic impacts. The State Water Board will take this into consideration when determining how to set enforcement priorities, recognizing that addressing systemic violations can result in behavioral changes that improve conditions.

The first step in enforcement prioritization is to determine the relative weight of the violation. The criteria for prioritization used in the policy area should be applicable statewide and focus on watershed conditions, the injury—or potential for injury—from the violation, and the project characteristics. In setting the priority of the violation, the Board will also consider the water diverter's history of past violations or submission of willful misstatements, whether the water diverter has implemented an internal mechanism for ensuring compliance, such as internal audits or early detection programs, and the violator's willingness to voluntarily correct violations, especially prior to State Water Board identification of a compliance issue.

The following comprises a non-exclusive list of criteria that State Water Board staff will use in setting enforcement priorities regarding violations. Additional information regarding the criteria listed below can be found in Appendix G.

1. violation within Class I and II streams in the policy area or within an existing or wild and scenic river system;
2. violations within fully appropriated or adjudicated stream systems;
3. potential injury to endangered species;
4. waste and unreasonable use and diversion;
5. injury to prior right holder;
6. large consumptive use projects receiving economic benefit from a violation or unauthorized diversion;
7. recalcitrant violators, repeat violators, and willful misstatements; and
8. other factors as justice may require

State Water Board staff will enter known violations in an enforcement database. Any violation in this database can be further evaluated for possible formal enforcement, and at a minimum shall receive informal enforcement. Violations meeting more than one of the criteria should receive a higher priority ranking. State Water Board staff will conduct a monthly review of the prioritized violations in the database and make a decision about the appropriate enforcement response based on the criteria above. State Water Board staff will assign a relative priority for enforcement for each violation. A description of the enforcement actions the State Water Board make take in response to violations is contained in Appendix H. Appendix H also describes the factors the State Water Board will consider when setting administrative civil liability amounts, which include the State Water Board's policy regarding the use of Supplemental Environmental Projects, and the steps the State Water Board will take to enforce the requirement that certain diverters in the policy area file Statements of Water Diversion and Use.

8.3 Continuing Authority to Amend Permits and Licenses

The State Water Board has continuing authority to amend or modify water right permits and licenses pursuant to Water Code sections 100 and 275. If, after investigation, the State Water Board determines that a permitted diversion results in an adverse impact to public trust resources or results in a waste or unreasonable use or unreasonable method of use or method of diversion of water, the State Water Board may modify a permit or license term or may impose specific requirements over and above those contained in the permit or license in order to protect the public trust, ensure that the waste is abated, or ensure that the diversion and use of water is reasonable. Similarly, the State Water Board may modify existing permits or licenses if the State Water Board determines that such modification is necessary to meet water quality objectives contained in water quality control plans established or modified pursuant to Division 7 (commencing with section 13000) of the Water Code. The State Water Board will provide any affected permit or license holder with notice of the intent to modify the conditions of the permit or license and with opportunity for a hearing prior to making any modifications.

8.4 Prohibition Against Waste and Unreasonable Use of Water

If after investigation, the State Water Board determines that a water diversion is wasteful or constitutes an unreasonable use, unreasonable method of use, or unreasonable method of diversion of water, the State Water Board may order a party who diverts and uses water to comply with requirements to abate the waste or ensure the reasonable use of water, method of use, and method of diversion. The State Water Board will only take such action after notice to the party and after providing an opportunity for hearing.

8.5 Protection of Public Trust Resources

The State Water Board has an affirmative duty to protect public trust uses, including fisheries, from the effects of water diversion and use. In the exercise of that duty, the State Water Board may order a party who diverts and uses water to comply with requirements to ensure protection of public trust resources if there is evidence that the diversion or use of water is impacting those resources. The State Water Board will only take such action after notice to the party and after providing an opportunity for hearing.

8.6 Enforcement Action where Water Right Application is Pending

Filing a water right application does not shield an unauthorized diverter from enforcement action. In deciding whether or not to take formal enforcement action to address an unauthorized diversion, the State Water Board will consider the applicant's diligence in submitting the information necessary to process the application and the factors set forth in Section 9.2 above and Appendix G. In addition, the State Water Board will consider whether the applicant (1) complies with interim operating conditions consistent with Section 2.2.1 of this policy, including at a minimum the season of diversion regional criterion; (2) conducts hourly monitoring of diversion(s) and makes daily averages of the data available on-line to the State Water Board; and (3) has completed and submitted to the State Water Board a Statement of Water Diversion and Use and submits to the State Water Board an online supplemental statement.

9.0 CASE-BY-CASE EXCEPTIONS TO POLICY PROVISIONS

This section applies to exceptions from policy provisions.

The State Water Board may grant exceptions to specific provisions of this policy where the State Water Board determines that:

1. The exception will not compromise maintenance of instream flows in the policy area; and

2. The public interest will be served.

Requests for case-by-case exceptions shall be submitted to the State Water Board during the environmental review of an application or petition.

Case-by-case exception requests shall contain:

1. a detailed description of the reason for the request,

2. the policy provisions that are involved;

3. documentation of the reasons why the exception will not compromise maintenance of instream flows in the policy area; and

4. an explanation of how the public interest will be served by the exception.

The State Water Board will evaluate whether the request is reasonable and whether sufficient cause exists for an exception. If the case-by-case exception involves potential environmental impacts, it shall be considered under CEQA and the State Water Board's public trust authority. Case-by-case exceptions shall be granted at a public meeting of the State Water Board. The Deputy Director for Water Rights shall recommend to the State Water Board whether to approve or deny the proposed exception.

10. MONITORING AND REPORTING OF DIVERSIONS; MONITORING AND REPORTING OF STREAMFLOWS; POLICY EFFECTIVENESS REVIEW

10.1. Monitoring and Reporting of Diversions

Permits shall require continuous monitoring of diversions for each point of diversion and other conditions necessary to demonstrate compliance with permit terms relating to bypass flows, seasons of diversion, and rate of diversion. For purposes of this Section, "continuous" means at time intervals of 1 hour or less.

Diversion data shall be reported with next Progress Report By Permittee or Report of Licensee, or whenever requested by the State Water Board. Permits shall include a term stating that the State Water Board intends to develop and implement a basin-wide program for real-time electronic monitoring and reporting in a standardized format if and when funds are available; that such reporting will be required upon a showing by the State Water Board that the infrastructure is in place to accept real-time electronic reports; and that it shall not be necessary to amend the permit at that time.

Comment [A42]: Commenter suggested edits substantially included in the April 2010 revised draft policy.

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10.1.1 Diversion Monitoring and Reporting for Direct Diversions and Diversions to Storage

Permits for direct diversions and diversions to offstream storage shall require monitoring, recording, and reporting the timing and quantity of water actually diverted from the stream (e.g., with an electronic inline flow meter).

10.1.2 Diversion Monitoring and Reporting for Direct Diversions and Diversions to Storage

Permits for onstream reservoirs shall require monitoring of reservoir levels, releases from the reservoir to the stream channel, and withdrawals from the reservoir (e.g., using a pressure transducer for the reservoir, and an inline flow meter for the releases and withdrawals from the reservoir, as applicable).

10.2 Monitoring and Reporting of Streamflows

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Permits require monitoring and recording of streamflow and temperature, which shall be achieved by either of the following methods:

10.2.1 Individual Stream Flow Monitoring and Reporting

Permittees may install an automated flow and temperature measuring device or devices downstream of the point of diversion.

The location of such devices shall be specified in the compliance plan approved by the State Water Board. The flow data shall be recorded on an hourly (or more frequent) basis in a format that can be readily downloaded into a computer spreadsheet program or database for subsequent reporting. The State Water Board may incorporate the data into a Regional Monitoring Program discussed below.

10.2.2 Participation in Regional Stream Flow Monitoring Program

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Permittees may participate in the regional monitoring program described in section 10.3. For participating permittees, permits will require payment to the entity designated by the State Water Board pursuant to section 10.3. Permit terms will also require access to the permittee's property for the gauging and data collection required by the monitoring entity necessary to implement the program, in accordance with the terms of a formal agreement between the permittee and the monitoring entity for payment and access.

10.3 Reporting and Publication on the Internet

Streamflow data required by section 10.2 shall be transmitted, in an appropriate format, not less than hourly, to an internet site accessible to the board and the public. Streamflow data shall also be submitted with Permittee Progress Reports, Reports of Licensee, or whenever requested by the State Water Board.

It is the intent of the State Water Board, subject to funding, to prepare and distribute standardized electronic forms for the information required by the policy.

It is the intent of the State Water Board, subject to funding, to provide the means by which the information required by this policy may be reported electronically. The Board

shall require electronic reporting but make allowances for paper reporting for water right holders on a case-by-case basis.

It is the intent of the State Water Board, subject to funding, to institute a system to publish on the Internet the data required by the policy and developed for the regional program described in section 10.4. The State Water Board may partner with other state or federal agencies or organizations for this purpose.

10.4. Regional Monitoring and Policy Effectiveness Review

The State Water Board shall develop and implement a Regional Monitoring and Policy Effectiveness Review program. The program shall be coordinated with any monitoring programs developed pursuant to the Russian River Frost Protection program, if it is adopted.

The purpose of the program will be to develop data through field monitoring and, based on the data, evaluate (1) the effectiveness of whether the standards for maintaining instream flows are protective of anadromous salmonids and their habitat over the medium term, in the range of a 10 to 20 year time horizon, as well as over the long term, and (2) whether the policy may need to be modified in order to support recovery of listed species and otherwise protect beneficial uses. The program will focus on evaluating the effectiveness of the standards for diversion season, minimum bypass flow, maximum cumulative diversion, and onstream dam mitigation measures, as well as other aspects of the policy.

Comment [A43]: Language substantially included in April 2010 revised draft policy with edits throughout section 10 regarding "as resources become available" and deletion of requirement to coordinate with Russian River, since policy area covers more than just the Russian River watershed.

The program will develop data through monitoring of stream hydrology, geomorphology, and anadromous salmonid habitat conditions in selected representative streams throughout the policy area.

Five years from the effective date of the policy, and every five years thereafter, the State Water Board will review the policy and determine whether it should be revised. The program may coordinate with and utilize and incorporate data from other ongoing monitoring programs carried out by other state, federal, and local agencies, to the fullest extent practicable.

The funding and institutional mechanism for the program may be modeled on the S.F. Bay Area Regional Board's Regional Monitoring Program or the Southern California Coastal Water Research Project. It is the intent of the State Water Board to develop the Regional Monitoring and Policy Effectiveness Review program, including the funding mechanism and the entity managing the data collection, within one year of the adoption of this policy. The entity or entities managing the data collection might include USGS, the University of California, water agencies, resource conservation districts, non-profits, or state agencies such as the Regional Water Boards.

The State Water Board will consider the recommendations contained in Chapter 10 and Appendix K of R2 Resource Consultants (2007a) when implementing this program.

The State Water Board will require water right holders to fund the development and implementation of the program (see mitigation monitoring payments specified in section 10.2 (participation in Regional Monitoring Program as an alternative to individual monitoring of stream conditions), and it shall also seek public funding.

If possible, the program will provide for USGS operation of gauges throughout the policy area. It will, at a minimum, provide for stream gauging at a level contemplated by Appendix K. It is anticipated that water right holders will pay for instruments and the staff time necessary for installation and upkeep, and that right holders will provide access to streams, but that water right holders will not be required to operate the program.

Comment [A44]: Language modified in April 2010 revised draft policy to read "as resources become available" because staff has concerns about imposing potentially significant costs on a relatively small number of permittees.

APPENDIX A
Water Availability Analysis Requirements

Appendix A. Water Availability Analysis Requirements

A.1.0 Water Availability Analysis

Before the State Water Board can issue a water right permit, it must find that there is "unappropriated water available to supply the applicant." (Wat. Code, § 1375, subd. (d).) "In determining the amount of water available for appropriation for other beneficial uses, the [State Water Board] shall take into account, whenever it is in the public interest, the amounts of water required for recreation and the preservation and enhancement of fish and wildlife resources." (*Id.*, § 1243.)

A.1.1 Submittal Requirements

A water availability analysis consists of (1) a Water Supply Report, which quantifies the amount of unappropriated water remaining instream after senior rights are accounted for; and (2) a Cumulative Diversion Analysis, which utilizes the instream flow criteria to evaluate the effects of the proposed project, in combination with existing diverters, on instream flows needed for protection of fishery resources.

The following technical reports shall be submitted to document the water availability analysis:

1. Water Supply Report
2. Upper Limit of Anadromy determination, where applicable
3. Cumulative Diversion Analysis
4. Report on site specific studies that were performed to identify more precisely the instream flow needs of the fishery resources at locations at and/or below anadromy, where needed

The technical reports shall document all underlying analyses.

A.1.1.1 Data Submissions

The raw data, spreadsheets, and models used to perform the water supply report and cumulative diversion analysis shall be provided for State Water Board review and approval, and shall meet the following requirements.

1. Analysis reports shall describe the assumptions used, and include a functional electronic version of the spreadsheet(s) that was used to perform the analysis, including the equations, input data and assumptions, and outputs used to complete the analysis.

2. Input files, calibration results, validation results, and output files shall be provided in electronic format with supporting documentation that describes the model's assumptions, underlying modeling principles, and operation.

3. Generally, no proprietary spreadsheets or proprietary computer models will be accepted; however output from proprietary programs used solely to visually summarize or demonstrate the output data or results from public domain spreadsheets or public domain computer programs that meet the above two requirements may be accepted by the State Water Board if the underlying data and assumptions are also submitted.

A.1.2 Water Supply Report

The applicant must demonstrate that there is unappropriated water in the watershed sufficient to supply the proposed project by submitting a Water Supply Report that compares the unimpaired water supply to the demand by senior water right holders, including demand by those claiming riparian and pre-1914 appropriative rights. This analysis is necessary to determine whether a sufficient amount of water remains instream to supply senior priority rights. The analysis shall be performed along the water **flow path** from the proposed point of diversion to the Pacific Ocean. If the State Water Board determines a project would have a de minimus impact on flows in a **flow-regulated mainstem river**, then the water flow path may terminate at the flow-regulated mainstem river. The applicant must consider the water supply impacts of the proposed project only at the points of diversion of senior water rights along this identified flow path; however, the demands of all senior water right holders within the watershed will be needed for the analysis. Only senior water rights with a season of diversion within or overlapping the diversion season of the application need to be considered. Guidelines for completing the Water Supply Report analysis are provided in Section B.2.0 of Appendix B.

The Water Supply Report shall include the following:

1. A map showing the locations of the points of diversion (PODs) of senior priority water right holders and water right claimants in the watershed. The map must conform to the map requirements contained in Section A.1.3;

2. A list of the senior priority water rights (permit, license, certificate, or registration), their seasons of diversion, and **face values** of their permits or licenses. To the extent information is available in the State Water Board's records, or other sources of information, the demand and season of diversion of riparian and pre-1914 appropriative water right holders and claimants shall also be included;

3. A tabulation of the estimated percentages of unappropriated water supply available at the POD for each senior priority water right on the water flow path after accounting for senior demands. This percentage may be obtained using estimates of the unimpaired flow volume of the stream at each senior POD and the seasonal demand volumes of the senior water right holders. For details on calculation methods, please see Appendix B sections B.2.0 through B.2.2. The seasonal demand volume is the sum of the demand volumes of the senior water right holders with the right to divert water during the proposed project's diversion

season that are within the watershed upstream of identified senior PODs along the water flow path. The demand volume shall be determined using the face value or maximum annual use limitation of each water right; however there may be diversions for which proration of face values or maximum annual use limitations may be appropriate (A. Miller, SWRCB Internal Memo, December 2007). For guidance on estimating the demand volumes of the senior water right holders, please refer to section B.2.1.4. All results shall be presented in a table listing the calculated percentage for each identified senior POD;

4. A calculation of the ratio of the proposed project's demand to the remaining unappropriated water supply at each identified senior POD. This analysis is needed for the purposes of (1) identifying locations where the proposed project is likely to have minimal impacts to the rate of flow, and (2) to assist with selection of points of interest for the cumulative diversion analysis. The ratio shall be obtained by dividing the proposed project's water demand volume by the remaining unappropriated water supply at each senior POD. These values shall also be presented in a table.

5. A **flow frequency analysis** of the seasonal unimpaired flow volume. A set of flow frequency analyses shall be provided at the POD(s) of the proposed project, the senior POD at which the percentage calculated in step 3 is the lowest, and any other senior PODs at which the ratio is less than 50%, if any. The frequency of occurrence of the average seasonal unimpaired flow volumes for each year of record should be determined and plotted graphically.

The details of the analysis shall be presented in report format with all necessary tables and graphs.

A.1.3 Map Requirements

The applicant shall provide maps with the Water Supply Report that the State Water Board may use to assist with the selection of POIs. Either digital or hard-copy maps may be submitted. The maps shall be in full color, no smaller than 11"X14", and shall be large enough to present the following information in sufficient detail.

1. The maps shall display topographic contours equivalent to those on USGS 7.5 minute quads.

2. The maps shall be large enough to trace the watershed from the proposed project down to one of the following, depending on the water flow path: (1) the nearest flow-regulated mainstem river, or (2) the Pacific Ocean.

3. All of the PODs associated with the proposed project, including reservoir footprints and place of use footprints. All shall be clearly marked.

4. The identified flow paths of streams affected by the proposed POD(s) shall be clearly marked. If an affected stream is not delineated on a USGS quad map, the applicant shall draw it in manually.

5. The PODs of senior water rights identified along the flow path that were used in the Water Supply Report shall be clearly marked.

6. The applicant shall note on the maps the locations of PODs within the watershed between the proposed POD(s) and the river/ocean used above. Include all pending applications, permits, licenses, small domestic use registrations, livestock stockpond use registrations and certificates, and, to the extent information is available in the State Water Board's records or other sources of information, riparian users and pre-1914 rights.

A.1.4 Determination of the Upper Limit of Anadromy

If there is sufficient unappropriated water to supply the proposed project after considering the rights of senior appropriators, the applicant must then evaluate the effects of senior diversions and the proposed project on instream flows needed for fishery resources to allow the State Water Board to determine if there is unappropriated water available for diversion. The upper limit of anadromy location will aid the State Water Board in selecting points to evaluate whether the proposed diversion may cause an effect on fishery resources.

The upper limit of anadromy is defined as the upstream end of the range of anadromous fish that currently are, or have been historically, present year-round or seasonally, whichever extends the farthest upstream. The upper limit of anadromy may be located on a perennial, intermittent, or **ephemeral stream**.

In some cases, the historic upper limit of anadromy is not known with certainty. In those cases, if the stream reach from which the applicant proposes to divert water appears to support fish under unimpaired conditions, the State Water Board will presume that the POD is located within the range of anadromous fish. This presumption might result in higher calculated minimum bypass flows than would be needed if the POD is actually upstream of the upper limit of anadromy. The applicant may overcome this presumption by demonstrating that the upper limit of anadromy is at a different location on the stream reach between the POD and the basin outlet, based on one of the following:

1. A study, previously accepted by the State Water Board, NMFS, or DFG, that identifies the location of the upper limit of anadromy on the stream reach between the POD and the Pacific Ocean or to a flow-regulated mainstem river, depending on the water flow path. Previous studies or surveys that catalog only the presence or absence of anadromous fish might not accurately define the upper limit of anadromy.

2. Information demonstrating that the gradient of a segment of the stream reach between the POD and Pacific Ocean or to a flow-regulated mainstem river, depending on the water flow path, exceeds a continuous longitudinal slope over a distance of large enough magnitude that anadromous fish can not move upstream beyond the lowest point of the gradient. The gradient shall be a continuous longitudinal slope of 12%, or greater, over a distance of 330 feet along the stream (R2 Resource Consultants, 2007b).

3. Site-specific studies conducted by a qualified fisheries biologist. The applicant may refer to stream classification determinations that were made in accordance with the methods in section A.1.6 for preliminary refinement of the geographic extent of the site-specific study. Fisheries biologist qualifications are described in section A.1.5. Prior to conducting the site-specific study, the name(s) and qualifications of the individual(s) selected to perform the studies shall be submitted to the State Water Board for review and approval. All field work, modeling, analysis, and calculations performed as part of this study shall be documented in detail sufficient to withstand credible peer review. The site-specific studies shall consist of any of the following:

    a. Identification of an impassable natural waterfall. This policy assumes all natural waterfalls are passable unless the applicant provides information satisfactory to the State Water Board that the waterfall is impassable. This information shall include, at a minimum, an evaluation of waterfall drop height, leaping angle, and **pool** depth in comparison to the documented ability for the target anadromous fish species to successfully ascend the barrier. Available references for assessing whether a natural waterfall is impassable include but are not limited to: Part IX of the CDFG California Salmonid Stream Habitat Restoration Manual (DFG 2003), Powers and Orsborn (1985) and Bjorn and Reiser (1991).

    b. Identification of an impassable human-caused barrier. The applicant may choose to demonstrate that the upper limit of anadromy is located below a human-caused barrier such as a dam, culvert, or bridge. This policy assumes that all human-caused barriers are passable or can be made passable unless the applicant provides information satisfactory to the State Water Board that a man-made barrier is impassable and will never be made passable.

    c. Habitat-based stream survey that delineates the upper limit of anadromy based on quantifiable stream conditions.

The applicant shall submit a report documenting the upper limit of anadromy determination. The State Water Board shall review the submitted information. If the State Water Board finds the information does not support the applicant's request to use

a different location for the upper limit of anadromy, the applicant shall proceed with the assumption that the POD is within the range of anadromy.

If the applicant conducts site specific studies to document the upper limit of anadromy, the State Water Board shall provide the study results to DFG for review and comment. The DFG shall be provided a reasonable period of time (not less than 30 days) to review and comment on the studies before the State Water Board makes a finding.

A.1.5 Fisheries Biologist Qualifications

A qualified fisheries biologist is a person with a bachelor's or higher degree in fisheries biology, wildlife biology, aquatic biology, wetland ecology or equivalent other course of study; and five or more years of professional experience in conducting fish habitat assessments. Documentation of qualifications shall be submitted to the State Water Board for approval. Examples of documentation include co-authorship of reports on fish habitat assessments and record of presence during field data collection work. Persons proposing to conduct either (1) site specific studies to modify regional policy criteria, or (2) biological assessments for the watershed approach shall provide documentation of direct, substantial participation in at least two previous fish habitat instream flow studies.

A.1.6 Stream Classification System

The presence or absence of fish or non-fish aquatic species in a stream affects the extent of the fishery protection needed at water diversions. Streams that contain fish require a higher level of protection than streams that do not contain fish, in large part because fish are mobile and require more physical aquatic habitat (living space) than non-fish species. In order to effectively apply protective measures, this policy uses the following stream classification system:

Class I: Fish are always or seasonally present, either currently or historically; and 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** stream exists that has a defined channel with a defined bank (slope break) that shows evidence of periodic scour and sediment transport.

A.1.6.1 Determination of Stream Class by the State Water Board

The State Water Board shall make a determination of stream class at a POD using indicators of habitat, not simply the presence or absence of species. Examples of

indicators of habitat include, but are not limited to, **coarse gravel**, channel width, depth, and slope, **instream cover**, **canopy**, surface water, **aquatic plants**, or **hydric soils**.

Class I streams, which may include intermittent or ephemeral streams, may be indicated by the presence or seasonal presence of fish, either currently or historically, or by the presence of habitat to sustain fish. Streams that are designated by NMFS as critical habitat for steelhead, chinook, or coho will be assumed to be Class I streams. However designated critical habitat does not encompass all Class I streams, and should not be relied upon as a basis for excluding streams from a Class I designation.

Class II streams, which may include intermittent or ephemeral streams, may be indicated by the presence of aquatic non-fish vertebrates or aquatic benthic macroinvertebrates or combinations of other indicators, such as free water, aquatic plants, or hydric soils. However, in Class II streams fish are never present, either currently or historically.

Ephemeral streams having defined channels with defined banks (slope break) that show evidence that sediment transport processes occur may indicate a Class III stream. For instance, evidence of periodic scour and deposition of sediment are indicators that a Class III stream exists. Class III streams also meet both of the following conditions: (1) fish are never present, either currently or historically, nor does habitat to sustain fish exist, and (2) the stream does not provide habitat for aquatic non-fish vertebrates and/or aquatic benthic macroinvertebrates.

Not all indicators need to be present to suggest aquatic habitat for fish, aquatic non-fish vertebrates and/or aquatic benthic macroinvertebrates. Neither will the presence of isolated indicators always signify that waters contain aquatic habitat for fish, aquatic non-fish vertebrates and/or aquatic benthic macroinvertebrates.

A.1.6.2 Determination of Stream Class by Stream Survey

If the applicant disagrees with the State Water Board's initial determination of stream class, the applicant shall conduct a stream survey to support a different determination. The stream survey shall be performed by a qualified fisheries biologist. Section A.1.5 provides the minimum education, knowledge, and experience requirements of a qualified fisheries biologist. Prior to conducting the stream survey, the applicant shall inform the State Water Board of the intent to conduct the stream survey, and shall provide the name(s) and qualifications of the individual(s) selected to perform the stream survey to the State Water Board for review and approval.

All data, studies, analysis, and conclusions obtained from the stream survey shall be provided to the State Water Board for review and approval. The DFG shall be provided a reasonable period of time (not less than 30 days) to review and comment on the stream survey results.

Stream surveys shall be conducted as follows:

1. The stream survey shall extend in the channel a minimum distance of 25 **bankfull widths** upstream and downstream of the POD. The total stream survey length shall be a minimum of 50 bankfull widths.

2. Quarterly surveys using appropriate sampling and/or collection equipment shall be conducted to determine the presence of fish, aquatic non-fish vertebrates, and/or aquatic benthic macroinvertebrates. These surveys shall be conducted in the spring, summer, fall, and winter, for at least two years; unless it is demonstrated that the presence of fish, aquatic non-fish vertebrates, and/or aquatic benthic macroinvertebrates can be determined in a shorter time period.

3. A survey of instream habitat conditions shall be made at low flows during the diversion season. Examples of instream habitat condition metrics that could be measured include:

    a. Mean **residual pool depth**
    b. Mean **riffle crest** depth
    c. **Mean riffle width**
    d. **Mean channel bankfull width**
    e. **Mean channel longitudinal gradient**
    f. Water temperature
    g. Amount and type of cover
    h. **Substrate** type

4. A visual survey shall be made after a storm runoff event for evidence of sediment transport. Such evidence may include, but is not limited to, the presence of gravel bars and deposits composed of gravel and sand. Annotated photographs must be provided for documentary evidence.

Results of the stream survey shall be summarized and analyzed. A stream class determination shall be made using the following guidance:

A. A stream is a Class I stream if the results of the survey indicate any of the following:

    1. Fish were observed during any of the quarterly surveys; or

    2. Instream habitat conditions observed during the requested diversion season provide suitable habitat for fish based on **habitat suitability criteria** provided by the qualified fisheries biologist.

B. A stream is a Class II stream if the results of the survey indicate all of the following:

1. The stream reach is outside of the known historical distribution limits for fish species. The applicant shall provide evidence supporting this finding.

2. Instream habitat conditions for fish were not observed during the requested diversion season based on habitat suitability criteria provided by the qualified fisheries biologist.

3. Non-fish aquatic vertebrate or aquatic benthic macroinvertebrate species were observed during one or more of the surveys.

C. A stream is a Class III stream if the quarterly surveys showed evidence of sediment transport, instream habitat conditions for fish were not observed during the requested diversion season based on habitat suitability criteria, and habitat for non-fish aquatic vertebrate, and aquatic benthic macroinvertebrate species were not observed during any of the quarterly surveys.

A.1.7 Selection of Points of Interest (POIs)

After review and approval of the Water Supply Report and the upper limit of anadromy determination, the State Water Board shall select POIs for an analysis of the proposed project's effects on instream flows. A POI is a location on a stream channel where the applicant shall analyze the effects of the proposed project, in combination with other water diversions, on fishery resources. The POIs identified for analysis will be selected by the State Water Board in consultation with DFG. The DFG shall be provided a reasonable period of time (not less than 30 days) to review and comment on the selected POIs before the State Water Board finalizes them.

The number and locations of the POIs selected for analysis shall depend on the stream classification at the location of the POD being analyzed. Stream classification procedures are described in Section A.1.6.

A.1.7.1 PODs on Class III streams

For proposed projects located on Class III streams, POIs shall be selected at the following locations:

1. At least one location on each Class II stream for which the POD's stream provides contributory flows;

2. The upper limit of anadromy; and

3. Locations at which the proposed project may adversely affect instream flows needed for protection of fishery resources. These may include, but are not limited to, locations where fish are present, locations directly upstream or downstream of the confluence of tributaries to the basin mainstem, locations downstream of onstream storage reservoirs, or locations downstream of direct diversion projects or diversions to offstream storage. If the applicant chooses to

perform site specific studies, the POI locations below anadromy may be added to the locations at which habitat studies are performed. For more details, see Appendix C, Guidelines for Site Specific Studies.

A.1.7.2 PODs on Class II streams:

For projects located on Class II streams, POIs shall be selected at the following locations:

1. The upper limit of anadromy; and

2. Locations at which the proposed project may adversely affect instream flows needed for protection of fishery resources. These may include, but are not limited to, locations where fish are present, locations directly upstream or downstream of the confluence of tributaries to the basin mainstem, locations downstream of onstream storage reservoirs, or locations downstream of direct diversion projects or diversions to offstream storage. If the applicant chooses to perform site specific studies, the POI locations below anadromy may be added to the locations at which habitat studies are performed. For more details, see Appendix C, Guidelines for Site Specific Studies.

A.1.7.3 PODs on Class I streams:

For projects located on Class I streams, POIs shall be selected at the following locations:

1. The proposed POD;

2. Locations at which the proposed project may adversely affect instream flows needed for protection of fishery resources. These may include, but are not limited to, locations where fish are present, locations directly upstream or downstream of the confluence of tributaries to the basin mainstem, locations downstream of onstream storage reservoirs, or locations downstream of direct diversion projects or diversions to offstream storage. If the applicant chooses to perform site specific studies, the POI locations below anadromy may be added to the locations at which habitat studies are performed. For more details, see Appendix C, Guidelines for Site Specific Studies.

If site specific study information is not available, locations at which the proposed project could not adversely affect instream flows needed for protection of fishery resources may be determined using the ratio of the proposed POD's water demand to the remaining instream flow available after accounting for senior demands, which was calculated in step 4 of section A.1.2. A POI location at or below anadromy at which the proposed project's demand is less than one percent of the remaining unappropriated supply will be considered a location at which the proposed project could not adversely affect instream flows. However, additional POIs may be required if there is substantial

evidence showing that the proposed project may have an adverse effect on instream flows at another location.

A.1.8 Cumulative Diversion Analysis

Even if the applicant can demonstrate that there is unappropriated water to supply the proposed project, there could still be impacts to instream beneficial uses caused by the proposed project in combination with **senior diversions**. A Cumulative Diversion Analysis is required to evaluate whether or not the proposed project, in combination with senior diversions, adversely affects instream flows needed for the protection of fishery resources. In cases where the Cumulative Diversion Analysis demonstrates that the proposed project, in combination with senior diversions, significantly affects instream flows, water may not be available for appropriation.

The Cumulative Diversion Analysis requirements vary depending on the proposed project's location in the watershed. The analysis considers senior diversions in the watershed between the proposed project and the most downstream POI, and contributory flows from tributaries draining into the flow path. Contributory flows from tributaries draining into the flow path can reduce the impacts of diversions in Class III or II watersheds on streamflows needed for fish in Class I streams. At points of diversion located above anadromy, the change in hydrology near the POD may appear significant. However, downstream, at and below the upper limit of anadromy, where salmonids can be affected, the change in hydrology can be slight. Depending on the hydrology and level of impairment in watersheds above anadromy, situations may exist in which diversions could operate with reduced or no minimum bypass flows and/or rates of diversion. The Cumulative Diversion Analysis allows projects upstream of anadromy to determine the minimum bypass flows and rates of diversion needed for their project by evaluating whether the project adversely affects instream flows needed for fishery resources where anadromy exists, after consideration of the flow reductions by senior diverters and contributory flows from stream tributaries.

In conducting this analysis, the applicant shall use hydrologic techniques acceptable to the State Water Board. Detailed analysis procedures are provided in Appendix B Section 5.

A.1.8.1 Diversions on Class III Streams

Projects on Class III streams may operate with one of three different bypass flows, depending on the project's cumulative flow effects on points downstream: (1) a bypass term set at the minimum bypass flow (2) a bypass term set to maintain winter low flows, or (3) no bypass term.

Projects located on Class III streams may be allowed to operate without ~~the~~ a minimum bypass flow, ~~and~~ maximum rate of diversion, or season of diversion ~~values that result in compliance with all of~~ under the following conditions.

Comment [A45]: The recommended concepts have been considered and adapted for inclusion in the April 2010 revised draft policy. Some of the commenter suggested language was retained, however because the task 3 report doesn't support a volume based approach the volume calculations were replaced with the NMFS suggestion regarding a 10% change in days above the MBF (per commenter suggestion later in this document).

- Cumulative depletion (cumulative equals the project and all senior projects) of not more than 5% of the seasonal (November 1 to March 31) volume measured downstream at the ULA and points of interest below; or

- Cumulative depletion of not more than 10% of the seasonal volume measured at the ULA and points of interest below, if reservoirs operating with neither a MBF or WLF bypass collectively deplete no more than 5% average annual volume; or

- A site-specific study demonstrating that the project's cumulative impacts are consistent with the management objectives.

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Where cumulative depletion by reservoirs with no MBF or WLF bypass is greater than 5% but less than 10%, the project shall operate with a WLF bypass. Where cumulative depletion is greater than 10% the project shall operate with a MBF bypass.

[[Delete from here to the closed brackets: The analysis may use any minimum bypass flow or maximum rate of diversion at the POD as long as all three conditions are met. Successful completion of the analysis may require iteration.

1. The project will not reduce the number of days the February median flow is exceeded at the POIs located on downstream Class II streams. This analysis shall be performed using the method described in Appendix B Section B.5.3.6. There is error associated with the estimation of daily flows. Because of this, on a case-by-case basis, the State Water Board may consider this condition to be satisfied when analyses show a minor change to the numbers of days the February median is exceeded, provided that the minor change is due to a slight variability in the estimation of flow; AND

2. The project will not change the existing number of days the flow needed for spawning, rearing, or passage occurs at the POIs located at and below anadromy. This analysis shall be performed using the method described in Appendix B Section B.5.3.4. Regional criteria or site specific criteria for the minimum bypass flow may be used in the analysis of flows at the POIs. The existing number of days that flow needed for spawning, rearing, and passage occurs shall be determined by including the effects of all senior diverters upstream of the POI. There is error associated with the estimation of daily flows. Because of this, on a case-by-case basis, the State Water Board may consider this condition to be met when analyses show a minor change to the number of days that the flow needed for spawning, rearing, and passage occurs. Provided that the minor change is due to a slight variability in the estimation of flow; AND

3. Either

    a. The project will not change the existing 1.5 year return flow at the POIs located at and below anadromy. The existing 1.5 year return flow shall be calculated considering the effects of all senior diverters upstream of the

POI. Upon approval by the State Water Board, the applicant may substitute a site specific threshold for the 1.5 year return flow.

OR

b. The project, in combination with senior diverters, will not reduce the unimpaired 1.5 year return flow at POIs located at and below anadromy by more than 5 percent. Upon approval by the State Water Board, the applicant may use a site specific criterion in lieu of the 5% of the 1.5-year return flow criterion.

The details of these calculations are described in Appendix B Section B.5.3.5.

A.1.8.1.1 Class III Exemption

If the analysis in Section A.1.8.1 shows a project can meet all three conditions without a minimum bypass flow and without a maximum rate of diversion limitation, that project shall also be exempted from the policy's season of diversion regional criteria and the onstream dam provisions contained in Policy Section 2.4.3. End deletion.]]

A.1.8.2 Diversions on Class II Streams

Projects on Class II streams may operate with one of two different bypass flows, depending on the project's cumulative flow effects on points downstream: (1) a bypass term set at the minimum bypass flow, or (2) a bypass term set to maintain winter low flows.

Projects located on Class II streams may be allowed to operate with a bypass flow equal to the winter low flow and without a maximum rate of diversion or season of diversion under the following conditions.

- Cumulative depletion (cumulative equals the project and all senior projects) of not more than 5% of the seasonal (November 1 to March 31) volume measured downstream at the ULA and points of interest below; or

- Cumulative depletion of not more than 10% of the seasonal volume measured at the ULA and points of interest below, if reservoirs operating with neither a MBF or WLF bypass collectively deplete no more than 5% average annual volume; or

- A site-specific study demonstrating that the project's cumulative impacts are consistent with the management objectives.

Where cumulative depletion is greater than 10% the project shall operate with a MBF bypass.

[[Delete to the closed brackets:
Projects located on Class II streams may be allowed to operate with the minimum bypass flow and maximum rate of diversion values that result in compliance with all of

Comment [A46]: The recommended concepts have been considered and adapted for inclusion in the April 2010 revised draft policy. Some of the commenter suggested language was retained, however because the task 3 report doesn't support a volume based approach the volume calculations were replaced with the NMFS suggestion regarding a 10% change in days above the MBF (per commenter suggestion later in this document).

the following conditions. The analysis shall be performed with a minimum bypass flow at the POD that is at least equal to the February median flow estimated at the POD. If the conditions below cannot be met by bypassing a February median flow, the bypass flow shall be increased until all of the conditions are met. Successful completion of the analysis may require iteration.

1. The project will not change the existing number of days the flow needed for spawning, rearing, or passage occurs at POIs located at and below anadromy. This analysis shall be performed using the method provided in Appendix B Section B.5.3.4. Regional criteria or site specific criteria for the minimum bypass flow shall be used in the analysis of flows at POIs located at and below points of anadromy. The existing number of days that flow needed for spawning, rearing, and passage occurs shall be determined by including the effects of all senior diverters upstream of the POI. There is error associated with the estimation of daily flows. Because of this, on a case-by-case basis, the State Water Board may consider this condition to be met when analyses show a minor change to the number of days that the flow needed for spawning, rearing, and passage occurs. Provided that the minor change is due to a slight variability in the estimation of flow; AND

2. Either

   a. The project will not change the existing 1.5 year return flow at POIs located at and below anadromy. The existing 1.5 year return flow shall be calculated considering the effects of all senior diverters upstream of the POI. Upon approval by the State Water Board, the applicant may substitute a site specific threshold for the 1.5 year return flow.

OR

   b. The project, in combination with senior diverters, will not reduce the unimpaired 1.5 year return flow at POIs located at and below anadromy by more than 5 percent. Upon approval by the State Water Board, the applicant may substitute a site specific threshold for the 1.5 year return flow.

The details of these calculations are described in Appendix B Section B.5.3.5. End deletion.]]

A.1.8.3 Diversions on Class I Streams

Proposed diversions on Class I streams shall be allowed to operate using the minimum bypass flow and maximum rate of diversion that demonstrates compliance with all conditions below. Successful completion of the analysis may require iteration.

If regional criteria are used, minimum bypass flows that are at least equal to the regional criteria at the proposed POD and the POIs shall be used in the analysis.

If site specific criteria are used, the analysis at the POIs may use the site specific minimum bypass flows and maximum cumulative diversion obtained in lieu of the regional criteria, and the proposed POD may be allowed to operate with the minimum bypass flow and maximum rate of diversion values that result in compliance with all three conditions.

1. The project will not change the existing number of days the flow needed for spawning, rearing, or passage occurs at POIs located at and below anadromy. This analysis shall be performed using the method provided in Appendix B Section B.5.3.4. The existing number of days that flow needed for spawning, rearing, and passage occurs shall be determined by including the effects of all senior diverters upstream of the POI~~. There is error associated with the estimation of daily flows. Because of this, on a case-by-case basis, the State Water Board may consider this condition to be met when analyses show a minor change to the number of days that the flow needed for spawning, rearing, and passage occurs. Provided that the minor change is due to a slight variability in the estimation of flow~~; AND

2. Either

   a. The project will not change the existing 1.5 year return flow at POIs located at and below anadromy. The existing 1.5 year return flow shall be calculated considering the effects of all senior diverters upstream of the POI. Upon approval by the State Water Board, the applicant may substitute a site specific threshold for the 1.5 year return flow.

   OR

   b. The project, in combination with senior diverters, will not reduce the unimpaired 1.5 year return flow at POIs located at and below anadromy by more than 5 percent. Upon approval by the State Water Board, the applicant may substitute a site specific threshold for the 1.5 year return flow.

   The details of these calculations are described in Appendix B Section B.5.3.5.

A.1.8.4 Documentation Requirements

Cumulative Diversion Analysis reports shall document all methods used and shall include an assessment of the impacts of the proposed project, in combination with senior diversions, on instream flows necessary for the protection of fishery resources. In addition to being consistent with the requirements described in sections A.1.1 and A.1.1.1, Cumulative Diversion Analysis Reports shall include the following information:

1. The minimum bypass flow and maximum rate of diversion that were used to achieve compliance with the cumulative diversion analysis requirements;

2. The details of the minimum bypass flow and maximum cumulative diversion calculations for POIs located at and below anadromy, if regional criteria were used;

3. Where needed, documentation of the site specific studies that were performed to identify more precisely the instream flow needs of the fishery resources at the POIs located at and below anadromy. (see the site specific study provisions in Appendix C);

4. The details of a daily analysis of the estimated effects of the proposed project and senior diversions on instream flows needed for spawning, rearing, and passage at each POI located at and/or below anadromy, including an evaluation of the number of days that instream flows meet or exceed the minimum bypass flow requirement at each POI located at and/or below anadromy for three flow conditions: unimpaired; impaired without the proposed project; and impaired with the proposed project;

5. The details of a daily analysis of the estimated effects of the proposed project and senior diversions on the natural flow variability of the stream at each POI located at and/or below anadromy, which consists of calculating the 1.5-year instantaneous peak flow for three flow conditions: unimpaired, impaired without the proposed project, and impaired with the proposed project, then either comparing these values against the maximum cumulative diversion criteria or comparing impaired conditions with and without the project (see Appendix B Section B.5.3.4);

~~6.For proposed PODs on Class III streams, the details of the effects of the proposed project and senior diversions on the number of days the February median flow is exceeded on Class II streams, including an evaluation of the number of days that instream flows meet or exceed the February median flow at each POI located on Class II streams for three flow conditions: unimpaired, impaired without the proposed project, and impaired with the proposed project (see Appendix B Section B.5.3.5);~~

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~~7.~~6. During the course of completing the Cumulative Diversion Analysis, the applicant may want to calculate project yields and the number of days available for diversion. If these calculations are performed, the applicant shall submit these results with the Cumulative Diversion Analysis report.

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If the analysis shows that the proposed project, in combination with senior diversions, affects the instream flows needed for fishery resources using the regional criteria or site specific criteria, then there may not be enough water available for the project as proposed.

If the analysis indicates the proposed project, in combination with senior diversions, does not affect the instream flows needed for fishery resources, then water is available for the proposed project.

The documentation required above is necessary for water code decisions based on seniority. Projects subject to CEQA may also be required to submit additional documentation such as an estimate of the cumulative effects of the proposed project and other existing or reasonably foreseeable future projects. Junior and future foreseeable diversions do not factor into water code decisions that are based on priority, but this cumulative effects analysis may be required by CEQA.

APPENDIX B

Guidelines for Preparation of Water Supply Report and Cumulative Diversion Analysis

Appendix B. Guidelines for Preparation of Water Supply Report and Cumulative Diversion Analysis

The following sections provide guidelines for preparing a Water Supply Report which quantifies the amount of unappropriated water supply remaining instream after senior rights are accounted for, and an Cumulative Diversion Analysis, which evaluates the effects of a proposed project, in combination with existing diversions, on instream flows needed for protection of fishery resources.

B.1.0 Gather Information Needed for Water Availability Analysis

The information needed for the water availability analysis include:

1. Streamflow records from gages near the Point(s) of Diversion (POD) proposed in the application; and,

2. Information from State Water Board files and records on senior water right diverters within the watershed. This includes any unpermitted applications with a higher priority than the project being analyzed and any claims of a pre-1914 or riparian water right. Information gathered for each diverter shall include location of diversion, season of diversion, storage capacity, rate of diversion, and any minimum bypass flow terms.

B.1.1 Obtain Streamflow Records Near the Point(s) of Diversion

Streamflow data is used to estimate unimpaired flow for the water availability analysis. The applicant shall identify all streamflow gages within the **watershed**. Streamflow gaging stations are typically operated by the United States Geological Survey (USGS), the California Department of Water Resources (DWR), or local agencies. Streamflow records may be obtained from the USGS via the internet using their National Water Information System (NWIS) web interface (http://waterdata.usgs.gov/nwis), from DWR via the internet using their California Data Exchange Center (CDEC) online hydrologic data collection network (http://cdec.water.ca.gov/) or from other federal, state, or local agencies, if available. If there are no streamflow gages within the watershed, the applicant shall locate the nearest streamflow gages.

The streamflow gage closest to a POD with at least ten **water year**s (October-September) of complete record may be used for analysis, and applicants should use the maximum number of years practicable. Other streamflow gages may be used if sufficient justification is provided. The water years do not have to be over a continuous time period. Missing records that have been filled with estimates by the USGS or DWR based on standard methods may be used. If the streamflow gage closest to a POD with at least ten years of complete records is influenced by many water diversions, a gage that is less influenced by diversions may be used for the water availability analysis.

The following information is required at each streamflow gage selected for the analysis:

1. Gage location;

2. Gage watershed drainage area;

3. Period of data record at the gage; and,

4. Daily flow time series data for the **period of record** for the gage.

B.1.2 Obtain Information on Authorized Senior Diverters in the Watershed

To determine the scope of information gathering, it is necessary to identify the **flow path** from the proposed point of diversion to the Pacific Ocean. If the State Water Board determines a project would have a de minimus impact on flows in a **flow-regulated mainstem river**, then the water flow path may terminate at the flow-regulated mainstem river. The geographic extent of the analysis includes the **watershed** upstream of the most downstream POD associated with the senior water right that is located the farthest downstream on the identified flow path. The applicant shall identify all senior water rights within the affected watershed that authorize diversion during the diversion season proposed in the application. The applicant shall identify senior water rights using the State Water Board Division of Water Rights files and records. The following information is required for each POD associated with each senior water right:

1. Location;

2. Direct diversion rate, unless a maximum rate of diversion is imposed as a term on the permit or license, in which case the maximum rate of diversion should be used;

3. Storage volume and position relative to the stream (onstream or offstream)

4. Maximum annual use limitation when it is less than the face value of the permit or license;

5. Minimum bypass flow, if imposed as a term on the permit or license. The minimum bypass term is not needed for the Water Supply Report, but will be needed for the cumulative diversion analysis;

6. Diversion season; and

7. Authorized uses at the point of diversion as specified in the permit or license.

B.2.0 Water Supply Report

The applicant must demonstrate that there is unappropriated water in the watershed sufficient to supply the proposed project by preparing a report that compares the unimpaired water supply to the potential demand by senior water right holders, including demand by those claiming unconfirmed riparian and pre-1914 appropriative rights.

B.2.1 Initial Calculations for Water Supply Report

Any senior water right with a point of diversion along the flow path shall be identified as a point of analysis for water supply. The following should be calculated at each identified senior POD along the flow path:

1. Drainage area (section B.2.1.1)
2. Average annual precipitation (section B.2.1.2)
3. Unimpaired seasonal flow volume (section B.2.1.3)
4. Demand volume of all upstream demands (section B.2.1.4)

B.2.1.1 Determine the Watershed Drainage Area Above Each Senior Point of Diversion Identified for Analysis Along the Flow Path

The watershed above an identified POD encompasses the total area that drains to the POD. The drainage area at each identified POD is determined by measuring the area of the upstream watershed. Steps required to measure the drainage area at each POD identified for analysis along the flow path are:

1. Locate the POD on a topographic map (digital or hard-copy map).
2. Delineate the watershed at the POD on the topographic map.
3. Measure the area of the delineated watershed using a manual planimeter or standard Geographic Information System (GIS) methods.

B.2.1.2 Estimate the Average Annual Precipitation for Each Senior Point of Diversion identified for Analysis Along the Flow Path and the Selected Streamflow Gage

The average annual precipitation at each identified senior POD and at the streamflow gage is determined by averaging the average precipitation over its watershed. Steps required to estimate the average annual precipitation of the watershed upstream of a senior POD or stream gage are:

1. Obtain average annual precipitation maps. Digital maps of average annual precipitation (1961-1990) developed by the PRISM group at Oregon State University (OSU) are available from the National Resource Conservation Service

(NRCS) climate mapping web site (*http://www.wcc.nrcs.usda.gov/climate/prism.html*). Hard-copy maps of average annual precipitation (1931-1963) developed by Rantz and Thompson (1967) are available from the USGS.

2. Overlay the delineated watershed for the identified senior POD and the average annual precipitation maps.

3. Divide the watershed into precipitation bands defined by the precipitation contour lines (lines of equal annual precipitation delineated at defined precipitation intervals).

4. Calculate the average annual precipitation over each precipitation band by averaging the annual precipitation of the precipitation contour lines that define the band.

5. Calculate the area-weighted average annual precipitation over the watershed by summing the products, for all the bands, of the area of each band multiplied by its average annual precipitation, and dividing the sum of the products by the drainage area of the watershed.

B.2.1.3 Estimate the Average Seasonal Unimpaired Flow Volume at Each Senior POD Identified for Analysis Along the Flow Path

The average seasonal unimpaired flow volume at the identified POD shall be estimated by one of the following methods: (A) adjustment of streamflow records, (B) using a precipitation-based streamflow model, or (C) another method acceptable to the State Water Board.

A. Adjustment of streamflow records method

Steps for calculating the average seasonal unimpaired flow volume at the identified PODs from streamflow records include:

1. Select a streamflow gage near the POD with at least ten water years of complete record of daily streamflow data (streamflow time series).

2. Calculate the average seasonal flow volume at the gage. Assume this is the average unimpaired seasonal flow volume. For each month in the diversion season, calculate the mean monthly flow volume at the gage. To get the mean monthly flow volume for a particular month, sum the daily flow data for that month to get a total volume, and repeat for that month for each year in the period of record. Next, sum the total monthly volumes for that month and divide by the number of years in the record to obtain the mean monthly volume for the particular month. Repeat these calculations for each month in the diversion

season and sum up each mean monthly total to get the average unimpaired seasonal flow volume for the diversion season at the gage.

3. The average unimpaired seasonal flow volume at each identified senior POD along the flow path can be estimated by using the average unimpaired seasonal flow volume at the gage, the watershed area for the gage and at the identified senior POD, and the average annual precipitation at the gage and at the identified senior POD with the following equation:

$$Q_{POD} = Q_{gage} * (DA_{POD}/ DA_{gage}) * (P_{POD}/ P_{gage})$$

where:

Q_{POD} = average unimpaired seasonal flow volume estimated at the POD, in acre-feet;
Q_{gage} = average unimpaired seasonal flow volume recorded at the gage, in acre-feet;
DA_{POD} = drainage area at the POD, in square miles;
DA_{gage} = drainage area at gage, in square miles;
P_{POD} = average annual precipitation at the POD, in inches; and
P_{gage} = average annual precipitation at the gage, in inches.

B. Precipitation-Based Streamflow Model

Subject to State Water Board approval, the applicant may propose using standard hydrologic techniques or public domain computer models for estimating the average seasonal unimpaired flow volume. Precipitation input data shall be provided over a minimum of ten complete and continuous water years. Model results shall be validated by comparison with recorded flows on or near the POD watershed. The recorded flows do not have to be unimpaired but the applicant shall take the impairment into consideration when calibrating the model. The modeled output flows shall be summed in units of acre-feet to obtain an average seasonal unimpaired volume. Model submittal requirements are described in Appendix A Section A.1.1.1 of the policy.

B.2.1.4 Determine the Demand Volume of all Senior Water Right Holders in the Watershed Upstream of Each Identified POD Along the Flow Path

For each POD identified along the flow path, the senior water right demand in the watershed upstream of that point must be determined for the Water Supply Report. Using the information gathered in section B.1.2, the senior demand should be determined using the face value or maximum annual use limitation of each water right in units of acre-feet, with the following exceptions (Miller, A., SWRCB, December 2007):

1. Only senior water right diverters with an authorized season of diversion during the proposed project's season of diversion shall be used.

2. Because the season of diversion specified in the Policy is October 1 to March 31, and irrigation of crops in the policy area typically does not begin before March 31, senior water rights authorizing direct diversion for irrigation before March 31 do not need to be considered part of the seasonal demand. However, since a post-harvest irrigation may occur between October 1 and October 31, the October demand of senior water rights with an authorized season extending into this period should be included.

3. Because a typical frost season starts around March 15, water rights authorizing direct diversion for frost protection shall use the authorized diversion rate times 10 hrs a day for 8 days between March 15 and March 31.

4. If the direct diversion season is year round or partially within the season of diversion allowed by this Policy, the senior demand shall be prorated by multiplying its face value or maximum annual use by the ratio of the months in the Policy's diversion season divided by the number of months authorized by the senior permit or license, unless more detailed water use information is known.

5. To be conservative, assume storage reservoirs are empty at the beginning of the diversion season. Therefore the demand for the storage right is the capacity of the reservoir, unless the water right for the reservoir authorizes refill. If a reservoir has a minimum pool which is not normally depleted, the amount of water held in the minimum pool may be taken into consideration in calculating the available storage capacity.

6. If the authorized collection season for storage reservoirs extends beyond March 31, either assume the reservoir(s) are full by March 31, or sum up the volume of water collected every month under the senior demand between the start of diversion season and March 31. The water collected to storage each month should be based on the proration methods to calculate the average seasonal unimpaired flow volume described in method A of section B.2.1.3, unless an alternative method is authorized by the State Water Board.

B.2.2 Analysis of Unappropriated Water to Supply the Proposed Project

An analysis of unappropriated water to supply the project is necessary to determine if there is sufficient water to supply the proposed project after senior rights are accounted for. As stated in B.1.2, the flow path from the proposed point of diversion to the Pacific Ocean or to a flow-regulated mainstem river shall be identified for this analysis. Any senior water right with a point of diversion along this identified flow path shall be identified as a point of analysis for water supply. Only senior water rights with a season of diversion within or overlapping the diversion season of the application need to be considered. The analysis includes the following steps:

1. The analysis shall include a tabulation of the estimated percentages of unappropriated water –available for appropriation at each identified senior

POD after accounting for senior demands. This shall be determined by subtracting the seasonal demand volume of all senior water right holders in the watershed upstream of each identified senior POD from the average seasonal unimpaired flow volume at the identified senior POD, then dividing this quantity by the average seasonal unimpaired flow volume. To obtain a percentage, multiply this value by 100. All results shall be presented in a table listing the calculated percentage for each identified senior POD.

2. To assist with the selection of points of interest, a calculation of the ratio of the proposed project's demand to the remaining unappropriated water supply at each identified senior POD. The remaining unappropriated water supply is determined by subtracting the seasonal upstream demand volume within the watershed of the identified senior POD from the seasonal unimpaired flow volume at the identified senior POD. This value and the proposed project's demand volume shall be compared at each identified senior POD for the purposes of (1) identifying locations where the proposed project is likely to have minimal impacts to the rate of flow, and (2) to assist with selection of points of interest for the cumulative diversion analysis. The ratio shall be obtained by dividing the proposed project's volume by the remaining unappropriated water supply. These values shall also be presented in a table.

3. The Water Supply Report shall include a **flow frequency analysis** of the seasonal unimpaired flow volume. A set of flow frequency analyses shall be performed at the proposed POD, the senior POD at which the percentage calculated in step 1 is the lowest, and any other senior PODs at which the ratio is less than 50%, if any. The frequency of occurrence of the average seasonal unimpaired flow volumes for each year of record should be determined and plotted graphically. The frequency of occurrence can be obtained from the Weibull formula:

   $$F=1-(m/(N+1)),$$

   where:

   F = the frequency of occurrence,

   m = the rank of the average seasonal unimpaired flow volume, with the largest value receiving m=1, and

   N = the length of the gage data record, in years.

   Generate graphs of frequency of occurrence plotted against average seasonal unimpaired flow volume. Draw a curve of best fit through the data points. A separate graph will be needed for each POD evaluated.

All the analysis described above shall be presented in report format with all necessary tables and graphs.

B.2.2.1 Map Requirements

1. The applicant shall provide maps with the Water Supply Report that the State Water Board may use to assist with the selection of POIs. Map submittal requirements are provided in Appendix Section A.1.3.

B.2.3 Is there unappropriated water to supply the proposed project?

After submittal of the Water Supply Report, the State Water Board will evaluate the unappropriated water supply that exists for the proposed project. This is not a determination of water availability because the effects of the proposed project, in combination with senior diversions, on instream flows needed for fishery resources, have not been evaluated yet.

B.2.4 Can the requested amount for the proposed project be adjusted?

If there does not appear to be a sufficient amount of unappropriated water to supply the proposed project, the applicant must decide whether the proposed project can be modified to use only the available unappropriated water supply. This decision provides the applicant an opportunity to continue with a modification of the requested amount rather than having the application denied.

B.2.5 Insufficient Unappropriated Water Supply

If the Water Supply Report shows that the amount of water requested by the proposed project is greater than the amount of unappropriated water remaining instream after senior vested rights and permits are accounted for, and the requested amount is not modified, the application may be denied.

If there are competing applications on a stream and there is sufficient unappropriated water to supply senior vested water rights and permit holders, but not sufficient unappropriated water available to also supply all competing applications, the State Water Board may choose between the competing applications for the water, and where factual circumstances warrant, adjust the relative priorities of the applications (Wat. Code, §§ 1253 and 1255.) The State Water Board may do so when it is in the public interest.

B.3.0 Determination of the Upper Limit of Anadromy

If there is sufficient unappropriated water to supply the proposed project, the applicant will need to evaluate the effects of senior diversions and the proposed project on instream flows needed for fishery resources to determine if the unappropriated water is available for diversion. Before this evaluation can be completed, the upper limit of

anadromy needs to be determined to aid the State Water Board in its selection of points of interest for the evaluation of the effects on fishery resources.

Procedures for determining the upper limit of anadromy are provided in Appendix A Section A.1.4.

B.4.0 Selection of Points of Interest (POIs)

After review and approval of the Water Supply Report and the upper limit of anadromy determination, the State Water Board shall select POIs for an analysis of the effects of the proposed project, in combination with other water diversions, on instream flows needed for fishery resources. Appendix A Section A.1.7 describes how POIs are selected.

B.5.0 Cumulative Diversion Analysis

The Cumulative Diversion Analysis assesses whether a proposed project may cause impacts to the minimum streamflows and the natural flow variability needed for protection of fishery resources. The cumulative diversion analysis requirements are provided in Appendix A Section A.1.8. This section of the Appendix contains procedures for conducting the analysis and for determining if water is available for appropriation.

B.5.1 Will the regional criteria for diversion season, minimum bypass flow and maximum cumulative diversion rate be used?

This decision allows the applicant to choose whether to (1) complete the cumulative diversion analysis applying the regional criteria for diversion season, minimum bypass flow and maximum cumulative diversion at the POIs at and/or below anadromy, or (2) go directly to conducting a site-specific study to develop site-specific criteria, then complete the cumulative diversion analysis using the site-specific criteria.

Most applicants would probably perform the cumulative diversion analysis using the regional criteria first, then conduct a site-specific study if the analysis indicates that the proposed project may negatively impact the instream flows needed for fishery resources, or if project yield is affected. However, the applicant has the option to go directly to site-specific studies, especially if existing site specific information is readily available.

B.5.2 Initial calculations needed for Cumulative Diversion Analysis

After the POIs have been selected, the applicant will need additional information to complete the analysis of the impacts to instream flows. The streamflow records and the information on senior water right holders from State Water Board Division of Water Rights files that have already been gathered will be used in this analysis.

Proposed projects on all streams will need to calculate the following at the POIs located at and/or below anadromy.

- Drainage area, using methods previously described in section B.2.1.1;
- Average annual precipitation, using methods previously described in section B.2.1.2;
- Mean annual unimpaired flow (section B.5.2.1);
- Minimum bypass flow (section B.5.2.2), and
- Maximum cumulative diversion (section B.5.2.3).

Additionally, proposed projects on Class III streams will need to calculate the February median flow at the POIs located on Class II streams (see section B.5.3.6, part 1.b. for method).

B.5.2.1 Estimate the mean annual unimpaired flow at the POIs

Mean annual unimpaired flow is the average rate of flow past a location if no diversions (impairments) were taking place in the watershed above that point.

Mean annual unimpaired flow shall be estimated by one of the following methods: (A) adjustment of streamflow records, (B) using a precipitation-based streamflow model, or (C) another method acceptable to the State Water Board.

A. Adjustment of streamflow records method

Steps required for this method are:

1. From the streamflow records collected in B.1.1, select a streamflow gage near the POI with at least ten water years of complete record of streamflow (streamflow time series). The water years do not have to be over a continuous time period if not available. Missing data that has been filled with estimates by the agency operating the gage based on standard methods is acceptable for use.

2. Calculate the mean annual flow rate at the gage by summing the recorded daily streamflow data for each day in the period of record and dividing it by the number of days in the period of record. Do not include data recorded for partial water years.

3. If the gage is located in a watershed that is impaired by water diversions, the mean annual flow rate at the gage shall be adjusted for the impairments to obtain an estimate of the unimpaired mean annual flow rate at the gage (Q_{gage}). The details of how the upstream demands were estimated, and how they were used to unimpair the gage shall be detailed in the analysis report. Use of average annual demand is acceptable for the purposes of this analysis.

4. The mean annual unimpaired flow rate at each POI is calculated from Q_{gage} by multiplying by the ratio of drainage areas and precipitation, according to the following equation:

$$Q_{POI} = Q_{gage} * (DA_{POI}/ DA_{gage}) * (P_{POI}/ P_{gage})$$

where:

Q_{POI} = mean annual unimpaired flow rate estimated at the POI, in cubic-feet per second;

Q_{gage} = unimpaired mean annual flow rate recorded at the gage, in cubic-feet per second;

DA_{POI} = drainage area at the POI, in square miles;

DA_{gage} = drainage area at gage, in square miles;

P_{POI} = average annual precipitation of the POI, in inches; and

P_{gage} = average annual precipitation of the gage, in inches.

B. Precipitation-Based Streamflow Model

Subject to State Water Board approval, the applicant may propose using standard hydrologic techniques or public domain computer models for estimating the mean annual unimpaired flow at the POI. This analysis shall be based on a ten-year simulation period, at a minimum. Model results shall be validated by comparison with recorded flows on or near the POD watershed. The recorded flows do not have to be unimpaired but the applicant shall take the impairment into consideration when calibrating the model. Model submittal requirements are described in Appendix A Section A.1.1.1.

B.5.2.2 Regional Criteria for the Minimum Bypass Flow

The regionally protective minimum bypass flow criteria at POIs located at and below the upper limit of anadromy shall be calculated as follows:

If the watershed drainage area at the POI is less than or equal to 1 square mile,

$$Q_{MBF} = 9.0\ Q_m$$

where:

Q_{MBF} = minimum bypass flow in cubic feet per second; and

Q_m = mean annual unimpaired flow in cubic feet per second.

If the watershed drainage area at the POI is between 1.0 and 321 square miles,

$$Q_{MBF} = 8.8\ Q_m\ (DA)^{-0.47}$$

where:

Q_{MBF} = minimum bypass flow in cubic feet per second;

Q_m = mean annual unimpaired flow in cubic feet per second; and

DA = the watershed drainage area in square miles

If the watershed drainage area at the POI is greater than or equal to 321 square miles,

$$Q_{MBF} = 0.6\ Q_m$$

where:

Q_{MBF} = minimum bypass flow in cubic feet per second; and
Q_m = mean annual unimpaired flow in cubic feet per second.

B.5.2.3 Regional Criteria for the Maximum Cumulative Diversion

The maximum cumulative diversion is equal to 5 percent of the 1.5-year instantaneous peak flow, in cubic feet per second. The 1.5-year instantaneous peak flow is the maximum instantaneous peak streamflow that occurs or is exceeded, on average over the long term, once every one and a half years. The frequency at which this peak flow is expected to occur is referred to as the **recurrence interval**. The 1.5-year instantaneous peak flow shall be calculated at each POI located at and below anadromy either by peak flow frequency analysis of instantaneous peak flow records or by other methods acceptable to the State Water Board.

The peak flow frequency analysis methods described below are the annual flood methodology described in Bulletin 17B "Guidelines for Determining Flood Flow Frequency" (IACWD, 1982) and the peaks over threshold methodology (also referred to as the partial duration method) described in Hydrology for Engineers (Linsley, et al, 1982). Although two peak flow frequency analysis methods are described, the peaks over threshold method is the preferred method, and applicants are encouraged to use it where possible.

The peak flow frequency analysis results provide the 1.5-year instantaneous peak flow at the gage. For this analysis, assume that the calculated 1.5-year instantaneous peak flow data are representative of unimpaired conditions. The 1.5-year instantaneous peak flow at each POI shall be estimated from the 1.5-year instantaneous peak flow at the gage using the proration methods described in method A of section B.5.2.1.

A. <u>Peaks over threshold method</u>

The peaks over threshold method (also referred to as the partial duration method) is more accurate for recurrence intervals less than five years (Linsley et al, 1982). Steps required are as follows:

1. Select a flow threshold so that approximately three peaks over the threshold will be recorded per year on average.

2. Select all distinct well-separated flood peaks exceeding the selected flow threshold.

3. Rank the peaks from largest to smallest.

4. Estimate the recurrence interval, T, for each peak flow by the Weibull formula:

$$T=(N+1)/m$$

where:

T= recurrence interval in years;
N=the record length in years; and
m=the rank of the peak, the largest peak having m=1.

5. Plot the magnitude of the peak flow versus the recurrence interval on log-log scale and estimate the 1.5-year instantaneous peak flow from a curve fit of the data.

B. Bulletin 17B Flood Flow Frequency methodology

Bulletin 17B provides guidelines for determining flood flow frequency using annual peak flow data in a log-Pearson Type III distribution. Reservoirs in the policy area tend to be associated with small dams that operate without large sudden changes in flow releases. Bulletin 17B notes that "The procedures [contained in this Bulletin] do not cover watersheds where flood flows are appreciably altered by [large] reservoir [flow] regulation..." (p. 2).

The following is a summary of the basic steps needed to determine the instantaneous 1.5 year peak flow based on the Bulletin 17B guidelines. Before starting the analysis, the peak flow from each year of record should be ranked in order of magnitude with the highest annual peak flow in the data set receiving a rank of 1 and the lowest receiving the rank of the N^{th} year of record. After ranking the annual peak flow data the following steps should be taken to determine the instantaneous 1.5 year peak flow for the gage:

1. Calculate the base 10 logarithm (Log) of each annual peak flow value Q_i.
2. Calculate the average of all the Log Q_i values
3. Calculate the **standard deviation** (S) of the Log Q_i values using the following equation:

$$S = \left[\frac{\sum_{i=1}^{N} \left(X_i - \overline{X} \right)^2}{(N-1)} \right]^{0.5}$$

where:

X_i = Log Q_i

$\overline{X}$ = the average of the Log Q values

N = number of years of annual peak flow data

4. Calculate the **skew** coefficient (G) using the following equation:

$$G = \frac{N\sum_{i=1}^{N}\left(X_i - \overline{X}\right)^3}{(N-1)(N-2)S^3}$$

where:

X_i = Log Q_i

$\overline{X}$ = the average of the Log Q_i values

N = number of years of annual peak flow data

S = the standard deviation

5. Using the calculated skew coefficient and an **exceedance probability** of 0.66 (1.5 year recurrence interval) determine the frequency factor K from Appendix 3 of Bulletin 17B

6. Calculate the instantaneous 1.5 year peak flow using the following equation:

$$Q = 10^{\overline{X}+KS}$$

A hard-copy of Bulletin 17B is available for purchase from the National Technical Information Service (NTIS), Springfield VA 22161, as report no. PB 86 157 278.

A digital copy of Bulletin 17B is available for free download in PDF format from the USGS web page at http://water.usgs.gov/osw/bulletin17b/bulletin_17B.html.

B.5.3 Daily Flow Study

The Daily Flow Study assesses the effects of the proposed project, in combination with senior diversions, to instream flows required for fishery resources at each POI located at and below the upper limit of anadromy. Proposed projects on Class III streams will also need to demonstrate that the project will not cause reductions in the number of days the February median flow is exceeded on downstream Class II streams.

The analysis requirements vary depending on the stream classification at the proposed project's POD. Regional criteria or site specific criteria shall be used to establish protective streamflows at the POIs at and/or below anadromy. [[Delete through the end brackets: There are no regional criteria for Class II and III streams; however, applicants shall demonstrate, by applying project-selected minimum bypass flows and maximum rates of diversion in this analysis, that project operation will not result in impacts to instream flow needs of fishery resources at the POIs at and/or below anadromy.

Proposed projects located on Class III streams: The analysis is iterative. Successful completion of the analysis will be demonstrated when the applicant finds the minimum bypass flow and rate of diversion for the project that results in (1) at POIs located at and below anadromy, no impacts to the minimum flow needs of fishery resources and the stream's natural flow variability; and (2) at POIs on Class II streams, no change in the number of days the February median flow is exceeded. The analysis shall follow the procedures found in sections B.5.3.1 through B.5.3.6.

Proposed projects located on Class II streams: The analysis is iterative. The analysis shall be performed with a minimum bypass flow at the POD that is at least equal to the February median flow estimated at the POD. Successful completion of the analysis will be demonstrated when the applicant finds the minimum bypass flow and rate of diversion for the project that results in the following for POIs located at and below anadromy: no impacts to the minimum flow needs of fishery resources and the stream's natural flow variability. The analysis shall follow the procedures found in sections B.5.3.1 through B.5.3.5. Procedures for calculating the February median flow are provided in Section B.5.3.6, part 1.b. End deletion.]]

Proposed projects located on Class I streams may apply either the regional criteria or site specific criteria when analyzing effects at the proposed POD. Depending on the level of impairment and the hydrology of the watershed, the analysis may be iterative. The analysis shall follow the procedures contained in sections B.5.3.1 through B.5.3.5.

The following analysis steps are described in detail in sections B.5.3.1 through B.5.3.5~~6~~:

1. Estimate time series of unimpaired daily flow at POIs located at and/or below anadromy during the proposed diversion season for each year in the period of record;

2. Estimate daily time series of impaired flow at POIs located at and/or below anadromy without the proposed project during the proposed diversion season for each year in the period of record;

3. Estimate the daily time series of impaired flow at each POI located at and/or below anadromy with the proposed project during the proposed diversion season for each in year in the period of record;

4. Estimate effects to instream flows required for spawning, rearing, and passage;

5. Estimate effects to instream flows needed for the maintenance of natural flow variability; and

~~6.For proposed PODs on Class III streams, estimate effects to instream flows at POIs on Class II streams.~~

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The analysis description written assumes the applicant applies the regional criteria at the POIs first, however, the applicant may instead perform a site specific study first to obtain site specific criteria at the POIs for use in the analysis.

B.5.3.1 Estimate time series of unimpaired daily flow at POIs located at and/or below anadromy

The unimpaired daily flow is the average daily rate of flow past a point in a stream if no diversions (impairments) were taking place in the watershed above that point. The time series of unimpaired daily flow is a continuous record of unimpaired daily flows. The time series shall include at least ten complete **water years**. Data must be complete for the water years used but the water years do not have to be consecutive if the data is not available.

The time series of unimpaired daily flow past a POI shall be calculated using methods similar to those used to estimate the mean annual unimpaired flow in B.5.2.1. The methods used to estimate the time series required for the daily flow study of the Cumulative Diversion Analysis differ slightly and are as follows:

A. Adjustment of streamflow records method

Collect the daily streamflow data records for the gage selected for analysis in method A of section B.5.2.1. Estimate the time series of daily flow at the POI by multiplying the daily flow at the gage by the ratio of the drainage area and precipitation using the methods described in method A of section B.5.2.1.

For the daily flow study of the Cumulative Diversion Analysis, the gaged record may be assumed to represent unimpaired conditions.

B. Precipitation-based Streamflow Model

If a precipitation-based streamflow model was used in the earlier parts of the analysis to estimate the unimpaired mean annual flow, the time series of unimpaired daily flows that was generated shall be used for the daily flow study.

C. Another method acceptable to the State Water Board

If another method acceptable to the State Water Board was used in the earlier parts of the analysis to estimate the unimpaired mean annual flow, the time series of unimpaired daily flows that were generated shall be used for the daily flow study.

B.5.3.2 Impair the unimpaired daily flows at the POIs located at and/or below anadromy using senior diversions without the proposed project.

The time series of impaired daily flows at a POI is estimated by calculating how much flow is diverted at senior PODs in the POI's watershed and how much continues downstream.

To obtain the time series of impaired daily flows at the POI, subtract the sum of the daily diversion rates for individual senior PODs in the POI's watershed from the daily unimpaired flow time series at the POI. The daily diversion rate is the rate at which water is taken based on the amount of water available instream on that day. In the case of direct diversion, the daily diversion rate may be as high as the maximum rate of diversion in the permit or license. For onstream reservoirs, the daily diversion rate is equal to the flowrate available instream until the reservoir is full, unless a maximum rate of diversion is specified. Daily diversion rates shall account for minimum bypass flow requirements contained in the permit or license. Daily diversion rates may need to be adjusted for multiple diversions in series.

Diversions from individual senior PODs are subtracted from the flow at the POI until the following conditions are reached:

1. For reservoirs add up the volume collected over time until the individual reservoir is full.

2. For direct diversions, convert the daily diversion rate to a daily volume of water collected. Add up the daily volumes until the maximum annual use is reached, or the end of the diversion season is reached if no maximum annual use is provided in the permit or license.

Applicants may refer to section B.2.1.4 for assumptions that may be used for this analysis.

B.5.3.3 Impair the unimpaired daily flows at the POIs located at and/or below anadromy using senior diversions and the proposed project.

Recalculate the impaired flows at the POIs by including the proposed project, using the guidance described in section B.5.3.2.

B.5.3.4 Evaluate whether the proposed project contributes to reductions in instream flows needed for spawning, rearing, and passage

Any time instream flows meet or exceed the minimum bypass flow, conditions are conducive for spawning, rearing, and passage. This analysis provides an estimate of whether the proposed project, in combination with senior diversions, may decrease the number of days that spawning, rearing, and passage could occur.

At each POI located at and below anadromy, calculate the following:

(1) the minimum bypass flow using the regional criteria from methods described in section B.5.2.2, if not already calculated;

(2) the unimpaired flow time series, using the procedure described in section B.5.3.1;

(3) the number of days that the unimpaired flow meets or exceeds the minimum bypass flow;

(4) the impaired flow time series without the proposed project, using the guidance provided in section B.5.3.2;

(5) the number of days that impaired flows without the proposed project meet or exceed the minimum bypass flow;

(6) the impaired flow time series with the proposed project, using the guidance provided in section B.5.3.3; and

(7) the number of days that the impaired flows with the proposed project meet or exceed the minimum bypass flow.

If the number of days counted in (7) is equal to the number of days counted in (5), the proposed project does not contribute to a significant reduction in the instream flows needed for spawning, rearing, and passage.

[[Note: We would prefer to replace this section with a sensible cumulative effects comparison of unimpaired (3) to impaired flows with the project (7). The NMFS suggestion of 10% loss of days to MBF by month is worth exploring. We are not sure whether 10% is the correct number, and there are other potential formulations worth considering (should it be by month, should it be for normal years, etc.). Given a little time, it would probably be possible to develop a metric that corresponds to the proposed allowable changes in stage contained in the proposed management objectives.]]

Comment [A47]: This section of the April 2010 revised draft policy has been edited per commenter suggestion

B.5.3.5 Evaluate whether the proposed project contributes to reductions in instream flows needed for the maintenance of natural flow variability

1. Estimate the 1.5-year instantaneous peak flow using the methods described in section B.5.2.3 for each of the three time series generated in sections B.5.3.1 through B.5.3.3 for each POI located at and/or below anadromy. These are the time series for unimpaired conditions, impaired conditions without the proposed project, and impaired conditions with the proposed project.

2. Calculate the following quantities at each POI:

   a. $$1 - \frac{\text{1.5 year instantaneous peak flow for impaired conditions without the project}}{\text{1.5 year instantaneous peak flow for unimpaired conditions}}$$

b. $1 - \frac{\text{1.5 year instantaneous peak flow for impaired conditions with the project}}{\text{1.5 year instantaneous peak flow for unimpaired conditions}}$

3. At each POI evaluate the following two conditions:

   a. Whether the value calculated in 2a is equal to the value calculated in 2b, meaning that the proposed project causes no change to the existing instream flow conditions; or

   b. Whether the value calculated in 2b is less than 0.05, meaning the proposed project, in combination with senior demands, causes less than a 5 percent change to the 1.5-year instantaneous peak flow from unimpaired conditions.

One of these two conditions must be met at each POI in order to show that the proposed project does not cause a reduction in instream flows needed for the maintenance of natural flow variability.

[[Delete this section:

B.5.3.6 Additional Analysis Step for Class III Points of Diversion - Does the proposed project affect the February median flow at POIs on downstream Class II streams?

1. Calculate the February median flow for each POI located on Class II streams downstream of the proposed project.

   a. Estimate the daily time series of unimpaired daily flow for each POI on the Class II stream(s) using the methods described in Section B.5.3.1.

   b. For each POI on the Class II stream(s), calculate the median of the estimated daily flows that occur in the month of February using the following steps.

      (1) Obtain the daily flow values that occur in February from the estimated daily time series of unimpaired daily flow.

      (2) Sort the daily February flow values from high to low.

      (3) The February median is the value of the data point that occurs in the middle of the sorted set of data points.

2. Impair the unimpaired daily flows at the POI locations using senior diversions without the proposed project. Use the methods described in Section B.5.3.2 to complete this part of the analysis.

Comment [A48]: R
endered obsolete by changes to A.1.8.1 and A.1.8.2.

Comment [A49]: T
his section has been retained in the April 2010 revised draft policy to allow flexibility for applicants

3. Impair the unimpaired daily flows at the POI locations using senior diversions and the proposed project. Use the methods described in Section B.5.3.3 to complete this part of the analysis.

4. Is the number of days the February median flow is exceeded affected by the proposed project?

   For each POI on the Class II stream(s), calculate the following:

   a. The number of days that impaired flows without the proposed project meet or exceed the February median flow;

   b. The number of days that the impaired flows with the proposed project meet or exceed the February median flow.

   c. If the number of days counted in (b) is equal to or greater than the number of days counted in (a), the proposed project will not reduce the February median flow at the POI. End deletion.]]

Comment [A50]: This section has been edited in the April 2010 revised draft policy per previous commenter suggestion regarding a cumulative threshold.

B.5.4 Does the proposed project affect instream flows needed for fishery resources using the regional criteria?

If the daily flow studies indicate that the proposed project is unable to meet the cumulative diversion analysis requirements contained in Appendix A Section A.1.8 using the regional criteria for POIs located at and/or below anadromy, then there may not be enough water available for the project as proposed.

If the daily flow studies indicate the proposed project meets the cumulative diversion analysis requirements contained in Appendix A Section A.1.8 using the regional criteria for POIs located at and/or below anadromy, then water is available for the proposed project.

B.5.5 Can the project be modified?

If the daily flow studies indicate the proposed project is unable to comply with the cumulative diversion analysis requirements using the regional criteria for POIs located at and below anadromy, the applicant may modify the proposed project so that it complies with the regional criteria, or do site-specific studies to identify more precisely the fishery resource instream flow needs at the POIs.

There are numerous ways in which the applicant could modify the project. Examples of project modifications include, but are not limited to: reductions in the amount of water collected to storage, reductions in the rate of direct diversion, placing a cap on the maximum rate of diversion, or raising the minimum bypass flow.

Depending on the modification to the project, the applicant may need to conduct additional daily flow studies to demonstrate the modified project is protective of the instream flow needs of fishery resources. If the modified project complies with the cumulative diversion analysis requirements using the regional ~~cirteria~~criteria, water is available for appropriation.

If the project cannot be modified, or if the modified project still does not comply with the cumulative diversion analysis requirements using the regional criteria, then the applicant may conduct site-specific studies to identify more precisely the diversion season, minimum bypass flow, and/or maximum cumulative diversion requirements necessary to meet the needs of fishery resources at the POIs.

B.6.0 Site-specific Study to Identify More Precisely the Diversion Season, Minimum Bypass Flow and/or Maximum Cumulative Diversion

The applicant may conduct site-specific studies to identify more precisely the fishery resource instream flow needs at the POIs. Details on site specific studies are found in Policy Appendix C.

B.6.1 Does the proposed project affect instream flows needed for fishery resources using the site-specific criteria?

If the daily flow studies show that the proposed project is unable to meet the cumulative diversion analysis requirements using site specific criteria, then the project as proposed does not leave enough water in the stream. Water may not be available for appropriation.

B.6.2 Can the proposed project be modified?

If the daily flow studies show that the proposed project is unable to meet the cumulative diversion analysis requirements using the site specific criteria, the proposed project may be modified so that enough water remains instream. Depending on the modification to the project, the applicant may need to conduct additional daily flow studies to demonstrate the modified project is protective of instream flows. If the project cannot be modified, water may not be available for appropriation, and further environmental analysis should be undertaken to provide information to determine whether a water right permit may be issued for the proposed project. Streams could be considered for placement on the Fully Appropriated Streams List if the State Water Board determines in a decision on a water right application that no water remains available for appropriation. (Wat Code § 1205, subd. (b).)

B.6.3 Modify the Proposed Project so that Protective Instream flows are Maintained

There are numerous ways in which the applicant could modify the project so that enough water remains in the stream for the protection of fishery resources. The end result of the modifications shall result in compliance with the site-specific criteria. Examples of project modifications include, but are not limited to: reductions in the amount of water collected to storage, reductions in the rate of direct diversion, placing a cap on the maximum rate of diversion, or raising the minimum bypass flow.

B.7.0 Water is Available for the Proposed Project

Water is available for appropriation if the water availability analysis demonstrates the proposed project does not impact senior diverters and the proposed project, in combination with senior diversions, does not adversely affect instream flows needed for fishery resources.

APPENDIX C

Guidelines for Site Specific Studies

Appendix C. Guidelines for Site Specific Studies

C.1.0 Site-Specific Studies for Diversion Season, Minimum Bypass Flow and/or Maximum Cumulative Diversion

This policy implements principles for protection of instream flows for fishery resources through the use of a season of diversion, a minimum bypass flow, and a maximum cumulative diversion rate. The season of diversion allows diversion to occur during periods in which instream flows are naturally high to prevent adverse effects to fish and fish habitat. The minimum bypass flow provides protective streamflows for fish spawning, passage, and rearing, and is implemented in the policy as an instream flow below which no diversion is allowed. The maximum cumulative diversion rate provides a limit on the cumulative rates of diversion of all authorized diverters in a watershed to minimize the effects of water diversion on natural flow variability and the various biological functions dependent on that variability.

The regionally protective criteria provide the applicant the opportunity to show that operation of their project will not cause adverse effects to instream fishery resources without the need for conducting expensive site specific fishery studies. To ensure protectiveness throughout the policy area, the regional criteria were designed to protect sites with the greatest instream flow needs. At some sites, therefore, more than adequate flows may be provided by the regional criteria.

Studies may be conducted to obtain site specific criteria that identify more precisely the instream flow needs of fishery resources. The applicant may propose implementing one or more regional criteria in combination with site specific criteria. Site specific studies consist of a reconnaissance-level habitat assessment, development and implementation of a site specific study plan, and a cumulative diversion analysis.

The studies should be guided by the principles stated in section 2.1 and the definitions of minimum bypass flow and winter low flow contained in section 2.2. The flow management objectives set forth in section 2.2.2 may be used as a guide to preparing and evaluating site specific studies.

Provisions for alternative approaches to site specific studies are described in Section C.1.3.

Comment [A51]: Language substantially included in April 2010 revised draft policy with minor edits to reflect changes in section numbers.

A reconnaissance-level assessment shall be performed to obtain field data to be used in developing a site specific study plan. To expedite processing, r~~R~~esults of the reconnaissance-level habitat assessment and the details of the proposed study plan that describes the work that will be performed in the site specific study ~~shall~~ should be submitted for State Water Board review and approval prior to commencement of site specific studies. The State Water Board may consult with DFG regarding the recommendations of the reconnaissance-level habitat assessment and the study plan. DFG shall be provided a reasonable period of time (not less than 30 days) to review and

comment before the State Water Board provides the applicant written recommendations or approvals.

Site specific studies implementing the study plan shall provide field data and analysis supporting any recommendations regarding a site specific minimum bypass flow, maximum cumulative diversion, and/or season of diversion. Site specific study reports shall include a cumulative diversion analysis to determine the effects of the proposed project, in combination with senior diversions, on instream flows needed for fishery resources.

All field work, analysis, and recommendations involving fishery habitat evaluations shall be performed by a qualified fisheries biologist. Fisheries biologist qualifications are described in Appendix A Section A.1.5. Hydrologic, temperature, and channel morphology aspects of the site specific study may require the involvement of a geomorphologist, hydrologist or engineer. Applicants shall provide the name(s) and qualifications of all of the individual(s) selected to participate in the development and implementation of habitat assessments and study plans to the State Water Board for review and approval prior to starting the work described in this section.

Policy Section 4.0 contains provisions for the formation of watershed groups. If a watershed group is formed, it shall study the instream flow needs of fish and fish habitat using the site specific study guidance described in this section.

C.1.1 Development of the Site Specific Study Plan

An initial reconnaissance-level habitat assessment and a proposed site specific study plan shall be prepared and submitted together. The initial habitat assessment evaluates habitat and stream conditions to aid in the development of the site specific study plan that will describe how the site specific studies will be performed. The following sections describe the information needs for these tasks.

C.1.1.1 Reconnaissance-Level Habitat Assessment

Information regarding habitat and populations of anadromous salmonid species during different life history stages and/or stream hydrology and morphology may be needed prior to designing appropriate methods and analyses for the detailed site specific study. The goals of the initial reconnaissance-level habitat assessment are to identify the habitat and stream conditions that will be studied in the detailed site specific study. The reconnaissance-level habitat assessment may also provide watershed specific information that could be used to identify appropriate methodologies for conducting the detailed site specific study.

The assessment reach shall extend from the upper limit of anadromy to the ocean or to the confluence with a flow-regulated watercourse. Field work associated with the reconnaissance-level habitat assessment shall be performed at the times of the year that are appropriate for the habitat types being evaluated. DFG fish survey reports or

reports from other fishery or watershed agencies/organizations may be referenced as part of this assessment.

The report detailing the results of the reconnaissance-level habitat assessment shall, at a minimum, include the following information:

1. Description of the fishery habitat within the assessment reach, including identification of the potential habitat for fish species (i.e., Chinook, steelhead, coho, rainbow trout, and/or other native species) which are currently or potentially could be present. Photographs and maps of the stream reaches surveyed may be provided;

2. Description of the habitat types (e.g., passage, spawning, incubation, adult holding, and/or juvenile rearing) that are present. Include a recommendation, supported by analysis, regarding which habitat types should undergo further evaluation in the detailed study for the purposes of estimating a site specific minimum bypass flow. If a site specific maximum cumulative diversion is also being considered, include a description of the types of habitat that may be present in side channels that may have periodic hydraulic connectivity (access) to the main stream channel;

3. If a site specific maximum cumulative diversion is being considered, provide descriptions of stream channel characteristics that may be used to inform the study, such as substrate composition, distribution and sizes of spawning gravels, channel slopes and widths, streamside vegetation, channel stability, and availability of reference streams;

4. Conclusions regarding the presence or absence of habitat for salmonid life stages, including a description, supported by scientific evidence, of the historical and current presence of anadromous salmonids by fish species and life history stages from the upper limit of anadromy to the ocean or to the confluence with a flow-regulated watercourse. Include a description of the field methodology and scientific analysis used to derive conclusions regarding habitat descriptions, including location of field surveys, dates of visits (and an explanation of why timing was adequate and appropriate), data collected, and analysis methodology used. Include a description of any DFG fish survey reports or reports from other fishery or watershed agencies, if used in the analysis; and

5. Recommendations regarding the goals of subsequent site specific study plans, including the identification of the habitat types that will be studied for the purposes of developing site specific criteria.

C.1.1.2 Site Specific Study Plan Elements

The Site Specific Study Plan identifies the steps or methods that will be used to perform the work necessary for estimating site specific criteria. The study plan will also include a schedule for obtaining data and a timeline for completion of the report documenting the analysis, results, and recommendations of the site specific study. The following sections describe the minimum information needs for various study plan elements.

C.1.1.2.1 Site Specific Minimum Bypass Flow or Winter Low Flow

The purpose of the minimum bypass flow or winter low flow study plan is to direct the field data acquisition, and the subsequent scientific evaluation of the collected data, so that conclusions may be developed regarding the protective minimum flow needs for upstream passage, spawning, and/or juvenile rearing at selected study locations. The site specific minimum bypass flow for the proposed diversion is obtained as a result of applying these protective minimum flow needs at the POIs in the cumulative diversion analysis, as described in Section C.1.2.4.

Comment [A52]: References to winter low flow have been removed from the April 2010 revised draft policy to allow for additional clarity.

The results of the reconnaissance-level habitat assessment shall be used to inform the minimum bypass flow study plan regarding the habitat types that will be studied, i.e., upstream passage, spawning, and/or juvenile rearing. At a minimum, the study plan shall provide: (1) the habitat types that will be studied; (2) the locations in the stream channel at which biological and physical data will be collected and the reasons why those locations were selected; (3) a description of the relevant biological and physical data that will be collected and the collection methods; (4) a description of the analysis method(s) that will be used to model habitat conditions and streamflow needs from the collected biological and physical data; and (5) a timeline for completion of study plan steps.

The data and analysis methods for estimating habitat flow needs that will be used to estimate a site specific minimum bypass flow will vary depending on the habitat types that will be evaluated in the site specific study. The study plan shall identify the habitat types that will be studied and their corresponding data and analysis needs.

C.1.1.2.1.1 Upstream Passage Flow

The goal of the upstream passage flow analysis is to determine the flow that is protective of adult fish passage in the most limiting stream sites. The determination of the most limiting stream site shall consider whether there are low flow and/or leaping-flow barriers to upstream passage present in the watershed.

Comment [A53]: Rationale: there are no places with habitat for coho that are not also habitat for steelhead, so the number used will always need to be 0.7. Also: peer reviewed data may vary but it is generally recognized that California's coho require as much or more water for migration than our steelhead.

Low Flow Barriers

Cross-sectional transects shall be located at the low flow limiting stream sites. Depth and velocity data collected at cross-sectional transects may be used to develop stage-discharge relationships. Flows necessary to allow fish passage at the transects shall be consistent with minimum upstream passage depth criteria of at least 0.7 ft for steelhead ~~, 0.6 ft for~~ and coho, and 0.9 ft for chinook. (R2 Resource Consultants and Stetson Engineers, 2007a.) If lower minimum upstream passage depth thresholds are being

considered, the desired values, including scientifically defensible justification that considers the protection of habitat for threatened and endangered fish species, shall be provided in the study plan for State Water Board review and approval.

Leaping-flow Barriers

Leaping-flow barriers may be analyzed using scientifically based threshold criteria. Flows necessary to allow fish passage at barrier sites shall be consistent with the leaping capabilities of the salmonid species of concern. Information needed shall include, at a minimum, an evaluation of drop height, leaping angle, pool depth, and the documented ability for the target salmonid species to successfully ascend the barrier. Documented leaping ability thresholds that will be used, including scientifically defensible justification, shall be provided in the study plan for State Water Board review and approval. The following technical references may assist with the determination of leaping ability thresholds. The applicant is not limited to these references:

- Bjorn, T.C., and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83-138 in Influence of forest and range management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19, Bethesda, Maryland.

- Powers, P.D., and J.F. Orsborn. 1985. Analysis of Barriers to Upstream Fish Migration: An investigation of the physical and biological conditions affecting fish passage success at culverts and waterfalls. Part 4 of 4. Final Report. Prepared by Albrook Hydraulics Laboratory, Washington State University for Bonneville Power Administration, Portland, Oregon. 120 pp.

- California Department of Fish and Game. 2003. California Salmonid Stream Habitat Restoration Manual, Part IX, Fish Passage at Stream Crossings.

C.1.1.2.1.2 Spawning Flow

The goal of the spawning flow analysis is to determine the flow that is protective of spawning habitat functions at limiting spawning habitat units. The study plan shall describe the locations at which data will be collected, and shall describe the data that will be collected at cross sectional transects within spawning areas at a range of flow levels to develop habitat flow relationships. Flows necessary for maintaining spawning habitat availability shall be at least consistent with the following minimum spawning depth criteria and favorable stream velocity criteria:

Species	Minimum Spawning Depth (ft)	Favorable Stream Velocities (ft/s)
Steelhead	0.8	1.0 - 3.0
Coho	0.8	1.0 - 2.6
Chinook	1.0	1.0 - 3.0

R2 Resource Consultants and Stetson Engineers, 2007a.

If lower minimum spawning depths or favorable stream velocities are being considered, the desired values, including scientifically defensible justification that considers the protection of habitat for threatened and endangered fish species, shall be provided in the study plan for State Water Board review and approval.

C.1.1.2.1.3 Juvenile Rearing

Juveniles may use a range of winter habitats during low flows. While pool habitat can be important, particularly with increasing latitude, the quantity and quality of such habitat is relatively insensitive to changes in low flow magnitude. In addition, where pool habitats are limited, juveniles may overwinter within riffle substrates. The juvenile rearing flow analysis shall provide an estimate of the flows needed to protect the most limiting habitat for juvenile rearing. In most cases, this would be riffle habitat.

Applicants may assume the minimum flows needed for the protection of spawning will also protect juvenile rearing. Otherwise, study plans for juvenile rearing habitat site specific studies shall describe the approach, including the field studies that will be used, to estimate the minimum flows needed for the protection of juvenile rearing habitat. In addition, the protective thresholds that will be used, including scientifically defensible justification, shall be provided in the study plan for State Water Board review and approval.

If a site specific maximum cumulative diversion is being considered, the study plan shall describe the data and analysis that will be used to evaluate how the site specific maximum cumulative diversion may affect access to side channel juvenile rearing habitat.

C.1.1.2.2 Site Specific Maximum Cumulative Diversion

The flow management objectives set forth in section 2.2.2 may be used to evaluate maximum cumulative diversions and set diversion rates for specific projects wherever they are also used to quantify thresholds for minimum bypass flow and winter low flow.

Anadromous salmonids depend on the natural annual hydrograph for upstream adult migration, successful spawning, egg incubation, juvenile rearing, and eventual smolt outmigration to the Pacific Ocean. Daily changes in streamflow depth (or 'stage'), attributable to natural streamflow fluctuations and water diversions, may be easier to measure, evaluate, and monitor than changes in streamflow.

Limiting changes in stage to 0.1 foot when flows exceed the minimum bypass flow will serve to (1) minimize unnatural adult salmonid exposure, stress, vulnerability, and delay during adult upstream migration, (2) encourage adult steelhead return to the Pacific Ocean following spawning, and (3) maintain frequent geomorphic processes important to stream channel maintenance and spawning habitat abundance and quality.

Comment [A54]: Section has been modified for the April 2010 revised draft policy based on commenter suggestions. 0.5 ft change threshold has not been included in the April 2010 revised draft policy because the concept is in conflict with the scientific basis report and policy principles as supported by DFG and NMFS. The 0.5 ft change is not consistent with the policy principles because it allows diversion below the minimum bypass flow and therefore may not be protective.

Limiting changes in stage to 0.05 foot when flows are between the minimum bypass flow and winter low flow will serve to (1) maintain the abundance and availability of spawning habitat, (2) minimize unnatural adult salmonid exposure, stress, and vulnerability during spawning, and (3) protect important juvenile and smolt rearing habitats.

Limiting diversions when flows are below the winter low flow as set forth above will serve to to (1) maintain benthic macroinvertebrate habitat in riffles fostering high stream productivity, (2) prevent redd desiccation and help maintain hyphoreic subsurface flows, (3) help sustain high quality and abundant salmonid juvenile and pre-smolt rearing habitat, and (4) facilitate smolt out-migration.

Site specific studies that do not utilize the flow management objectives in section 2.2.2 should proceed as follows. The maximum cumulative diversion rate provides a limit on the total instantaneous rate of withdrawal of water by all diverters in a watershed. The goal of the maximum cumulative diversion site specific study is to obtain a site specific maximum cumulative rate of diversion that does not lead to measurable long term changes in bankfull width and depth, or measurable long term changes to substrate grain size distribution percentiles in Class I streams downstream of the proposed diversion. Determining a maximum cumulative diversion rate that meets with these goals will also ensure that natural flow variability, and the various biological functions that are dependent on that variability, are protected. The site specific maximum cumulative diversion criterion also should not cause adverse reductions in accessibility to side channel juvenile rearing habitat, where present. Estimates of site specific maximum cumulative diversion criteria that meet these objectives may be derived from modeling and/or empirical field studies.

C.1.1.2.2.1 Modeling

At a minimum, study plans that propose modeling shall include: (a) a description of the model that will be used, including the underlying scientific basis and the science supporting the use of the model to estimate a maximum cumulative diversion rate; (b) the model assumptions that will be used, including those that may be used to define physical characteristics of the stream, dimensional similarity and/or sediment budgets; (c) the reasons why the model assumptions are appropriate, and the approach that will be used to estimate the level of uncertainty in model results based on the assumptions used; and (d) a description of how the model will provide an estimated site specific maximum cumulative diversion that does not lead to measurable long term changes in bankfull width and depth, or measurable long term changes to substrate grain size distribution percentiles.

C.1.1.2.2.2 Empirical field studies

Empirical field studies may consist of an investigation of conditions on reference streams (physically comparable streams exhibiting conditions associated with relatively

unimpaired flows) with a comparison of those conditions against conditions on the affected stream reach. Empirical field studies may also rely on monitoring of changes to bankfull width and depth over time. At a minimum, study plans for empirical studies shall describe what quantitative measurements would be obtained to estimate habitat changes on the affected stream reach in response to diversion, and how the quantitative measurements will be used to develop an estimated site specific maximum cumulative diversion that does not lead to measurable long term changes in bankfull width and depth, or measurable long term changes to substrate grain size distribution percentiles.

C.1.1.2.3 Site Specific Season of Diversion

Salmonid survival is dependent on external water temperatures. Adverse health effects may occur when salmonids are exposed to temperatures outside their optimal range. The Regional Water Quality Control Board Basin Plans contain narrative water quality objectives that state that the natural receiving water temperature shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. In addition, there are streams within the policy area that are on the federal Clean Water Act section 303(d) list of water quality limited segments due to elevated surface water temperatures.

The site specific studies for extending the diversion season shall evaluate whether the extended diversion season affects stream temperatures needed for maintaining adequate habitat conditions. Study plans shall include a description of the analysis that will be performed to determine whether the identified season of diversion contributes to elevated water temperatures below the POD that may result in impacts to habitat for threatened and endangered salmonids. It shall also include a description of the locations at which data will be collected and temperature effects will be modeled, including justification of why those locations are appropriate for the analysis. The protective temperature thresholds that will be used, including scientifically defensible justification, shall be provided in the study plan for State Water Board review and approval. The following technical references may assist with the determination of protective temperature thresholds. The applicant is not limited to this list.

- U.S. EPA Navarro River Total Maximum Daily Loads for Temperature and Sediment
  Internet link: http://www.epa.gov/region09/water/tmdl/navarro/navarro.pdf

- California Regional Water Quality Control Board, North Coast Region. 2000. Navarro River Watershed Technical Support Document for the Total Maximum Daily Load for Sediment and Technical Support Document for the Total Maximum Daily Load for Temperature.
  Internet link:
  http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/navarro_river/navarrotsd.pdf

Study plans for requesting an extended diversion season shall include a study plan for estimating the minimum bypass flow needs of the downstream Class I stream during the portions of the diversion season that are outside the December 15 through March 31 diversion season established by the regional criteria. The regional criterion for the maximum cumulative diversion may be applied with the extended diversion season as a starting point, but the applicant may need to perform a site specific study to obtain site specific maximum cumulative diversion criteria that does not adversely affect streamflows or temperatures needed for maintaining habitat for threatened and endangered salmonids.

C.1.2 Documentation of Results of Site Specific Studies

At the completion of the site specific studies, a technical report documenting field studies, modeling, and analysis results shall be prepared and submitted to the State Water Board for review and approval. The field work, modeling, analysis, and calculations shall be documented in detail sufficient to withstand credible peer review. The following sections describe additional minimum reporting requirements.

The State Water Board may consult with the DFG and NMFS regarding study results. DFG and NMFS shall be provided a reasonable period of time (not less than 30 days) to review and comment on the study results before the State Board makes a determination regarding the results. Any site-specific criterion proposed by an applicant or group of applicants shall be consistent with the principles described in Section 2.1 and shall be approved by the Deputy Director.

C.1.2.1 Results of Minimum Bypass Flow and Winter Low Flow Site Specific Studies

Comment [A55]: Reference to WLF has not been included in April 2010 revised draft policy to reflect scope of methodology

The documentation of the results of minimum bypass flow site specific studies shall include, but is not limited to, the following information:

1. A description of the study results and the analysis supporting the conclusions; including, but not limited to: (a) the purpose for any field surveys that were performed, i.e., reasons why the field surveys were undertaken, what habitats and life stages were evaluated and why; (b) the method(s) used to analyze the field data, including the assumptions used and how the field data were used in the analysis; (c) the biologic or physical criteria used as the threshold for determining protective streamflows; if alternative depth criteria or favorable stream velocity criteria were used, the report shall describe why these alternative thresholds were appropriate, including the literature citations used; and (d) a discussion of the protective minimum streamflows needed for each habitat type analyzed, including how the flows were determined, by reference to the definitions provided in policy section 2.2.

Comment [A56]: Language not included in April 2010 revised draft policy because these definitions were moved to different locations. Commenter suggested language from section 2 has been substantially placed in section C.1.2.1 of the April 2010 revised draft policy.

2. Field study methods and data obtained, including: (a) a description of the field sampling design used, including the field methods and equipment used to obtain data; upon notice, the applicant may be required to provide literature citations; and (b) descriptions of the locations at which data were collected, including the rationale used to select the locations, the measurements taken at each location, purpose of the selected locations, map(s) depicting the proposed diversion, senior water rights and sampling locations, and sampling equipment used at each location.

Upon request, the applicant may be required to provide an inventory of the collected raw data including, but not limited to, dates of collection, photographs of transect locations, water depth and velocity measurements obtained for each channel cross section evaluated, temperature, GPS coordinates and maps of data collection locations, and purpose of each location.

C.1.2.2 Results of Maximum Cumulative Diversion Site Specific Studies

At a minimum, documentation of a maximum cumulative diversion site specific study shall explain how field data, modeling, and analysis were used to derive a site specific maximum cumulative diversion and how the proposed site specific value does not lead to measurable long term changes in bankfull width and depth, or measurable long term changes to substrate grain size distribution percentiles. In addition, an analysis shall be provided that evaluates whether the site specific maximum cumulative diversion criterion causes any adverse reductions in accessibility to side channel juvenile rearing habitat.

In addition, if modeling studies are used, at a minimum, sensitivity, calibration, and verification results shall be provided, including estimates of the level of uncertainty in the model results. If empirical field studies are performed, at a minimum, results shall include all data, the statistical and geomorphic analyses used to demonstrate that the reference streams and affected stream have comparable characteristics or that the long term monitoring results show no long-term change to bankfull width and depth, and any statistical or empirical relationships developed to estimate the response of habitat conditions to changes in streamflow.

C.1.2.3 Results of Season of Diversion Site Specific Studies

At a minimum, study results shall include an analysis describing the extent of stream reach downstream of the proposed diversion that would be affected by increased stream temperature caused by the diversion, and whether the increased stream temperature cause adverse effects to salmonid habitat. Changes to the existing temperature conditions within downstream Class I streams may be allowed if the study results demonstrate that the changes do not cause adverse effects to salmonid habitat.

C.1.2.4 Cumulative Diversion Analysis

Comment [A57]: Section edited in April 2010 revised draft policy based on commenter suggested flow management objectives

The results of a cumulative diversion analysis shall be provided that evaluates the effects of the proposed diversion, in combination with senior diversions, on instream flows needed for fishery resources by reference to the principles stated in section 2.1, the definitions in section 2.2, and the guidance in section 2.2.2. The cumulative diversion analysis shall consider the locations of the proposed diversion and senior diversions in the watershed, and contributory flows from tributaries draining into the flow path.

The interim flow management objectives set forth in section 2.2.2 may be used to evaluate the results of site specific studies. The cumulative diversion analysis methods described in Appendix A Section A.1.8 and Appendix B Section B.5 may also be used. For the purposes of the analysis, the locations at which the habitat studies were performed shall be designated as the POIs located at and below anadromy. At each POI, if a minimum bypass flow study was performed, the minimum streamflow that is protective of all habitat types shall represent the minimum bypass flow at the POI. The analysis shall demonstrate the proposed diversion, in combination with senior diversions, will not adversely affect the instream flows needed for fishery resources.

If the applicant does not plan to use these methods, the study plan shall describe: (1) how the site specific minimum bypass flow and rate of diversion for the proposed diversion will be obtained from the minimum streamflow data that protects habitat types; and (2) the cumulative diversion analysis that would demonstrate that the proposed diversion, in combination with senior diversions, will not affect instream flows needed for fishery resources.

C.1.3 Alternative Site Specific Approaches

A site specific approach may be proposed that may implement parameters other than a minimum bypass flow, maximum cumulative diversion, or season of diversion. A description of the alternative approach and a study plan shall be submitted to the State Water Board for review and approval prior to commencement of field work and analysis.

The alternative approach and any proposed site-specific criteria shall be consistent with the principles described in Section 2.1. The State Water Board may consult with DFG regarding the alternative approach proposal, study plan, and study results. DFG shall be provided a reasonable period of time (not less than 30 days) to review and comment before the State Water Board provides the applicant written recommendations.

C.1.3.1 Development of Site Specific Study Plans for Alternative Approaches

An initial reconnaissance-level habitat assessment and a proposed site specific study plan shall be prepared and submitted together. The initial reconnaissance-level habitat assessment evaluates habitat and stream conditions to aid in the development of the site specific study plan that will describe how the site specific studies will be performed.

Section C.1.1.1 describes the information that shall be provided to document the initial reconnaissance-level habitat assessment.

The study plan shall provide the assumptions and scientific basis for the alternative approach in detail sufficient to withstand credible peer review. The study plan shall also describe, at a minimum: (1) the habitat types that will be studied; (2) the locations in the stream channel at which biological and physical data will be collected and the reasons why those locations were selected; (3) description of the relevant biological and physical data that will be collected and the collection methods; (4) a description of the analysis method(s) that will be used to model habitat conditions and streamflow needs from the collected biological and physical data; and (5) timeline for completion of study plan steps. The approach shall consider the habitat and scientific issues identified in the sections above. A cumulative water diversion analysis shall be performed as part of the site specific study. The methods described in Appendix A Section A.1.8 and Appendix B Section B.5 may be used. Any alternative method for performing a cumulative water diversion analysis for determining the effects of the proposed project and senior diversions on fishery resources shall be described in the study plan in sufficient detail such that it is sufficient to withstand credible peer review.

C.1.3.2 Documentation of Results of Alternative Site Specific Studies

Reports documenting the results of implementing the study plan shall provide relevant details on the problem statement, and the supporting basis for the methods and approach, including relevant hydrology, hydraulics, geomorphology. Reports shall provide sufficient information to demonstrate that the cumulative effects of the proposed diversion on streamflow, stage, and velocity, in combination with senior diversions, will not affect instream flows needed for fishery resources. The State Water Board may consult with the DFG and NMFS regarding study results. DFG and NMFS shall be provided a reasonable period of time (not less than 30 days) to review and comment on the study results before the State Board makes a determination regarding the results. Any site-specific criterion proposed by an applicant or group of applicants shall be consistent with the principles described in Section 2.1 and shall be approved by the Deputy Director.

At a minimum, reports shall include the following information:

1. A description of the study results and the analysis supporting the conclusions; including, but not limited to: (a) the purpose for any field surveys that were performed, i.e., reasons why the field surveys were undertaken, what habitats and life stages were evaluated and why; (b) the method(s) used to analyze the field data, including the assumptions used and how the field data were used in the analysis; (c) the biologic or physical criteria used as the threshold for determining protective streamflows; and (d) the recommended site specific criteria and how it was determined, including a discussion of the protective streamflows for the habitat types analyzed and the habitat type requiring the highest protective streamflows.

2. A cumulative diversion analysis that demonstrates the proposed diversion, in combination with senior diversions, will not adversely affect the instream flows needed for fishery resources.

3. Field study methods and data obtained, including, but not limited to: (a) a description of the field sampling design used, including the field methods and equipment used to obtain data (upon notice, the applicant may be required to provide literature citations); and (b) descriptions of the locations at which data were collected, including the rationale used to select the locations, the measurements taken at each location, purpose of the selected locations, map(s) depicting the proposed diversion, senior water rights and sampling locations, and sampling equipment used for at each location.

4. If modeling studies are used, sensitivity, calibration, and verification results shall be provided, including estimates of the level of uncertainty in the model results

Upon request, the applicant may be required to provide an inventory of the collected raw data including, but not limited to date of collection, photographs of locations of habitat transects and water depth and velocity transects, channel cross sections, temperature, GPS coordinates and maps of data collection locations, and purpose of each location.

Notes:

- Other Appendices were deleted from this draft only for the sake of easier printing and emailing.
- The Glossary and Flow Charts would be amended to conform to text. A few other conforming amendments may be necessary.
- The Table of Contents has not been updated to reflect amendments.

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Page 3: [1] Comment [A5] **Author**

This definition has been substantially placed in Appendix I of the April 2010 revised draft policy. Edits were made to reflect the winter low flow will be used for class II streams (e.g. therefore rearing flows should not be included here).

Page 3: [2] Comment [A6] **Author**

The deleted language has been retained in the April 2010 revised draft policy to allow for a narrative overview of the instream flow criteria. Limiting this section to only defintions of MBF and WLF may be confusing to the reader and is not comprehensive. Furthermore, the language regarding water code provisions that apply to alternative regional criteria is important information for readers (see DCH comment 1)