Appendix F. Implementation of A.1.8.3 Guidelines and Policy Review

F Implementation of A.1.8.3 Guidelines and Policy Review

This appendix provides guidance on how to calculate the percentage volume depletion for proposed projects using methods consistent with those in the Volume Depletion Approach Study (Study). Recommendations for future reviews of the North Coast Instream Flow Policy (Policy) are also presented.

F.1 Example Calculation of Volume Depletion for a Proposed Project

In this Study, percentages of depletion in a study basin were prescribed in order to test the impact on habitat. In each study basin, diversion depletions were varied over a range from 1% to 10% of the seasonal unimpaired flow volume at the upper limit of anadromy (ULA). For future applicants using the A.1.8.3 guidelines, the percentage of depletion will be unknown and will need to be computed. Using methods consistent with this Study, we present an example of how to compute the percentage of volume depletion for a proposed project.

The guidelines in A.1.8.3 are intended to 'measure cumulative effects in percent change to seasonal flow volume'. The seasonal volume is computed over the period from November 1 through March 31.

The procedure to compute the percentage volume depletion for an example proposed project is given in Table F-1. We have assumed that, prior to computing the percentage volume depletion, the ULA and stream classification have been previously determined per Policy sections A.1.4 and A.1.6, respectively. We also assume that points of interest (POIs) have been selected per Policy section A.1.7. Figure F-1 shows the locations of a proposed project Point of Diversion (POD), three senior PODs, the ULA, and one downstream POI. The proposed project and senior water rights depicted here do not exist but are shown as a possible configuration of existing and proposed diversions.

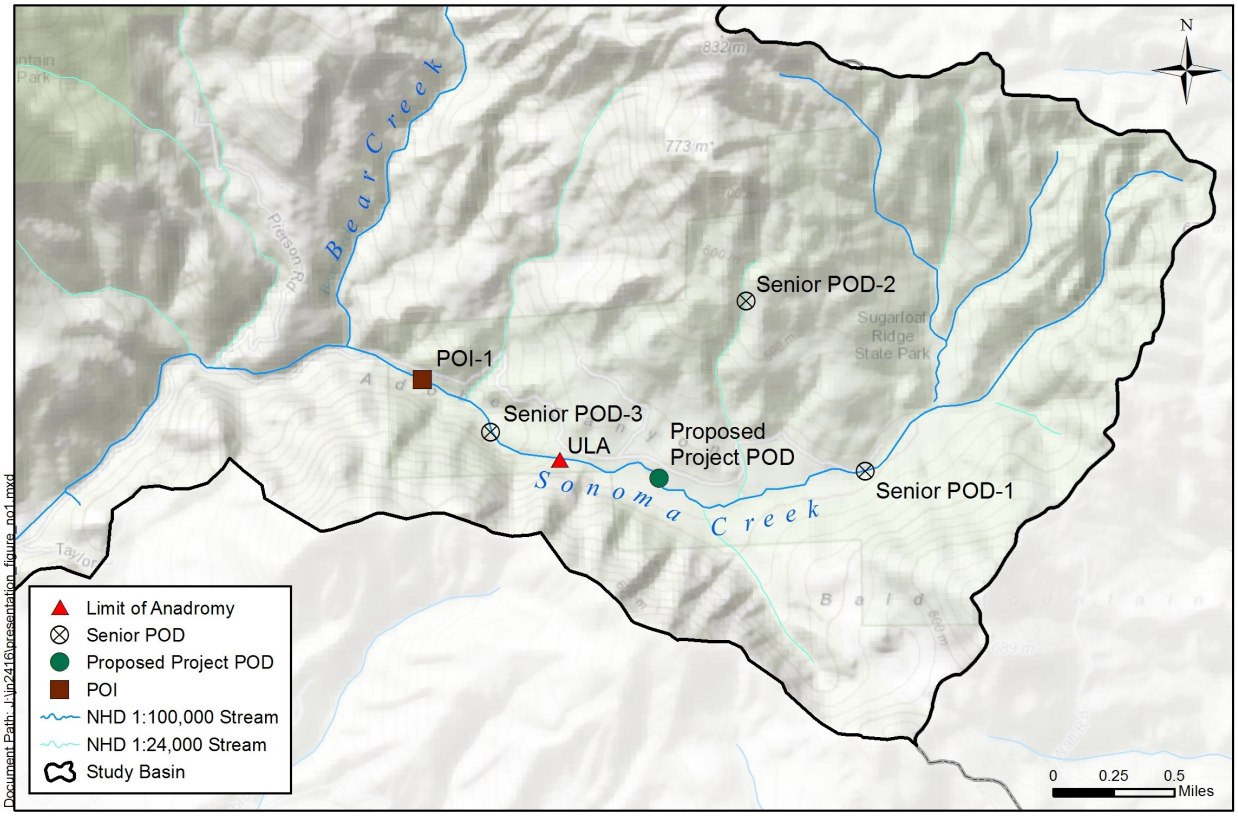

Fig. F-1 POD, POI and ULA Locations for Example Volume Depletion Calculation

Table F-1. Example Volume Depletion Calculation

Step	Example Explanation/Calculation
1. Identify the proposed project POD.	The proposed project POD is located on a Class II stream at the location shown on Figure F-1 (solid green circle).
2. Identify the maximum annual diversion volume proposed at the POD.	The proposed project will have a maximum annual diversion volume of 10 ac-ft.
3. Estimate the seasonal unimpaired flow at the ULA and at the POI. The season over which unimpaired flows are computed is November 1 through March 31.	Results from the HSPF models[1] have been used here to estimate the average unimpaired seasonal flow volume at the ULA and POI. Values here represent the average seasonal flow over the 10-year model period: 11/1-3/31 unimpaired flow volume at ULA = 760 ac-ft 11/1-3/31 unimpaired flow volume at POI-1 = 1,000 ac-ft
4. Locate all senior projects and determine the senior water right demand during the seasonal runoff period from November 1 through March 31. Information on senior water rights may be obtained from the State Water Board's eWRIMS database. (*www.waterboards.ca.gov/ewrims)* Applicants should compute the senior demand using the face value or maximum annual use limitation of each water right that may contribute to depletions of the seasonal unimpaired flow. Assumptions should be conservative, following the guidelines and exceptions in Policy section B.2.1.4. The season for considering exceptions under section B.2.1.4 is the period from November 1 through March 31.	We have assumed the following for the senior water rights: POD-1: Diversion to storage; maximum annual use of 8 ac-ft; diversion season of 10/1-3/31 POD-2: Diversion to storage; maximum annual use of 12 ac-ft; diversion season of 11/1-3/31 POD-3: Direct diversion; maximum withdrawal rate of 0.085 cfs; year-round diversions Senior water right demands are calculated as follows: POD-1: Senior demand during the seasonal period is 8 ac-ft. Even though the POD's season of diversion begins on October 1, the maximum annual use should be assumed to occur between November 1 and March 31. POD-2: Senior demand during the seasonal period is 12 ac-ft. POD-3: Senior demand is calculated by applying the direct diversion withdrawal rate to the five-month seasonal period from November 1 through March 31. At a rate of 0.085 cfs for 5 months (150 days), the total senior diversion in the seasonal period is 25 ac-ft.
5. Compute the total seasonal senior diversions upstream of the ULA and POIs.	At ULA, upstream senior diversions = seasonal diversions at POD-1 plus POD-2 8 ac-ft + 12 ac-ft = 20 ac-ft At POI-1, upstream senior diversions = seasonal diversions at POD-1 plus POD-2 plus POD-3 8 ac-ft + 12 ac-ft + 25 ac-ft = 45 ac-ft
6. Add the diversion volume of the proposed project to the senior diversions at the ULA and POI.	Seasonal diversions at ULA = 20 ac-ft + 10 ac-ft = 30 ac-ft Seasonal diversions at POI-1 = 45 ac-ft + 10 ac-ft = 55 ac-ft
7. Compute the volume depletion: divide seasonal diversions at the ULA or POI by the seasonal unimpaired flow at that point.	Percentage volume depletion at ULA = 30 ac-ft / 760 ac-ft = 3.9% Percentage volume depletion at POI-1 = 55 ac-ft / 1,000 ac-ft = 5.5%
8. Use the flowchart in Figure 6-7 to determine the appropriate guidelines. If a volume depletion is computed at multiple POIs, the higher volume depletion must be used to determine the appropriate guidelines.	The higher volume depletion of 5.5% at POI-1 is used to determine the appropriate guidelines. For a Class II stream with volume depletion between 5% and 10%, there are three options illustrated in Figure 6-7. The applicant may move forward using the guidelines from this Study (Option 3: No Diversion Season; Regionally Protective MBF from §2.2.1.2; and February Median MCD). If the applicant wants to use different diversion criteria, Option 1 or 2 may be pursued.

[1] These results are from a precipitation-based streamflow model developed for this Study; applicants may use other methods such as adjustment of gaged streamflow records.

F.2 Policy Review

This excerpt from Policy Section 10.4 describes the review process and schedule for future Policy reviews and monitoring:

> "It is the intent of the State Water Board to develop a Regional Monitoring and Policy Effectiveness Review program once resources become available.
>
> The purpose of the program would 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 would 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.
>
> …Five years from the effective date of the policy, and periodically 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." (§10.4)

The results of this Study include recommendations that may only be implemented through a revision of the Policy (see Chapter 6). In addition, the State Water Board engaged three independent scientists to provide peer review of this Study (Stetson and R2, 2014). Through that process, potential topics for future Policy review were suggested. The following is a summary of the Study recommendations and potential topics for future Policy reviews.

- In Section 6.3 of the Study, we include recommendations for additional conditions for Class II diversions with maximum cumulative volume depletion less than or equal to 5%. The A.1.8.3 guidelines for Class II diversions with maximum cumulative volume depletions equal to or less than 5% cannot be changed through the results of this Study and must be done through a Policy revision. We recommended that additional conditions be applied to Class II applications with no more than 5% maximum cumulative volume depletion. In these cases, adding a maximum cumulative diversion rate equal to the February median flow would be protective of natural flow variability. To protect passage and spawning in October and November, the regionally protective minimum bypass flow in Policy Section 2.2.1.2 would be protective. These additional conditions are necessary to protect downstream habitat and should be implemented through a revision of the Policy.
- A peer reviewer raised the question of how geology and geomorphology affect flow regimes within the Policy area (Comments 1.3.1 and 1.3.3 in Stetson and R2, 2014). Such investigations may be included in the Policy review process. The collection and compilation of regional data in watersheds with geologic and geomorphologic differences may shed light on the effectiveness of the Policy within such watersheds.
- A peer reviewer raised the question of how flow regimes differ on Class II and III streams (Comment 1.3.4 in Stetson and R2, 2014). For this Study, we endeavored to install flow gages on both Class II and III streams, but field conditions at Class III streams were not suitable for continuous streamflow gaging. The streams likely to be Class III were small and steep with intermittent flow. The steepness and lack of continuous water made installation of water level dataloggers impractical: datalogger measurements would have been inaccurate due to wetting and drying cycles and flow turbulence caused by the high gradient. In the future, other

techniques could be investigated, such as collecting discrete measurements during runoff events or installing a flow measurement structure such as a weir or flume. Such measurements may be collected at PODs proposed by Class III applicants, or through a separate program designed to measure flow on Class III streams.

- A peer reviewer recommended that different types of models be explored to evaluate the regional effectiveness of the Policy (Comment 1.4.1 in Stetson and R2, 2014). Specifically, the reviewer suggested the model Distributed Hydrology Soils and Vegetation Model (DHSVM). This Study utilized HSPF models to simulate three representative watersheds within the Policy area. As part of future evaluations of the Policy's effectiveness, a regional model covering more watersheds in the Policy area may be considered.

F.3 Reference

Stetson and R2. March 2014. Response to Scientific Peer Review Comments on the Protectiveness of Alternative Guidelines in North Coast Instream Flow Policy Section A.1.8.3. Prepared for California State Water Resources Control Board Division of Water Rights. Prepared by Stetson Engineers Inc. and R2 Resource Consultants, Inc. March 5, 2014.