State Water Resources Control Board

Division of Water Rights

Linda S. Adams
Secretary for Environmental Protection

Tam M. Doduc, Board Chair
1001 I Street • Sacramento, California 95814 • (916) 341-5300
Mailing Address: P.O. Box 2000 • Sacramento, California • 95812-2000
Fax (916) 341-5400 • http://www.waterboards.ca.gov

Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Karen Niiya KYN
Senior Water Resource Control Engineer

FROM: Aaron Miller ASM
Water Resource Control Engineer

DIVISION OF WATER RIGHTS

DATE: December 20, 2007

SUBJECT: Policy for Maintaining Instream Flows in Northern California Coastal Streams (policy) – Water Availability Analysis Assumptions for Estimating Partial Face Value of Senior Diverters

Appendix 1 of the policy contains guidelines on preparing a water availability analysis. The water availability analysis methodology is comprised of (1) a water supply analysis used to calculate unappropriated water and (2) an instream flow analysis used to determine if unappropriated water is available for appropriation after accounting for water needed to remain instream. The water demand volume of senior water right holders within the watershed is needed for both the water supply analysis and the daily flow study portion of the instream flow analysis. This water demand volume shall be determined using the face value or maximum annual use limitation of each water right in units of acre-feet; however there are situations in which a partial face value demand would be appropriate to use.

Section A.2.1.4 of the policy describes the procedures and assumptions for using the partial face value of a water right to calculate demand for the purposes of water availability analysis. This Memorandum describes the rationale for these assumptions and the text in bold corresponds to text from section A.2.1.4.

1. **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.**

Most of the crops grown in the Policy area are not irrigated during the policy's season of diversion. However, some senior diverters authorized to directly divert water for irrigation may have an authorized season of diversion that overlaps the policy's October 1 to March 31 diversion season.

For a season of diversion that begins before March 31:

The water availability analysis does not need to account for demands from senior diversions that are authorized to directly divert water for irrigation purposes if the diversion season begins before March 31, because irrigation is a demand that, on average, does not typically occur in the spring before March 31. Frost protection use is an agricultural use that begins around March 15, before the policy's diversion season ends. Item 2 describes how to estimate the partial face value demand of frost protection use.

For a season of diversion that extends beyond October 1:

Post-harvest irrigation can occur after October 1. Direct diversions for irrigation use that have diversion seasons that extend beyond October 1 should be assumed to need the water for post-harvest irrigation. Since post harvest irrigation can occur during the diversion season set by Policy criteria; the partial face value demand that occurs in October shall be included in the water availability analysis.

If better data exists regarding a specific diversion that suggests the diversion operates in a different manner from the typical use, the more accurate estimate of the demand for irrigation use during the diversion season set by Policy criteria should be used.

2. **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.**

Frost protection is a variable use of water throughout the policy area. Frost protection is typically needed for fruit crops, mainly vineyards in the policy area, when plants begin producing buds, flowers, and small fruitlets, and evening temperatures drop to freezing or below freezing. Frost protection occurs by spraying water over the plants to keep the air temperature around the crops from dropping below freezing. Because evening temperatures are variable, the need for frost protection is also variable.

Since frost protection is a variable use of water, it is unreasonable to assume that frost protection will occur every day between March 15 and March 31 when determining the demand of senior diversions within the policy area. Use of average

values to estimate frost use is not recommended because water right licenses are based on the maximum beneficial use in any one year during the permitting period. Therefore the demand for frost users should be based on an estimate of the maximum beneficial use that could occur between March 15 and March 31.

A frost protection demand estimate was established using temperature records from data sets throughout the policy area. The number of days between March 15 and March 31 for which the recorded daily low temperature was 33 degrees Fahrenheit or less were counted to determine the maximum number of days when frost protection likely occurred for each year in the record. The maximum number of days of occurrence for a particular year in each data set were averaged to get an average maximum number of frost days for the policy area. The maximum number of frost days between March 15 and March 31 in the policy area was 9 days. The average maximum number of frost days for all the locations evaluated was 7 days. To be conservative 8 days was selected as an estimate for the Policy area.

On any given frost day, the pumps used for frost protection will run for a variable number of hours. Most frost pumps are only run when air temperatures are at or below freezing. Therefore an estimate as to the number of hours of diversion for frost protection is needed. Hourly temperature data were not readily available. A conservative number was chosen based on staff experience conducting compliance inspections. Ten hours of diversion during a particular frost event was selected as a worst case estimate. The assumption of 8 frost days with each occurrence lasting 10 hours equals 80 hours of frost between March 15 and March 31. This assumption is conservative and should be protective of instream flows.

The validity of this assumption was checked by comparing it against permit conditions for an existing permit within the policy area. Permit 21006 (Application 29203) authorizes the direct diversion of 21 cfs for frost protection between March 10 and March 31. This permit was also given a maximum annual amount limitation of 120 acre-feet. The assumption of 8 frost days with direct diversions lasting 10 hours each day was compared against the annual amount limitation. Using a rate of 21 cfs for 10 hours equals approximately 17 acre-feet of water diverted during a frost event. Multiplying the 17 acre-feet times 8 days of diversion equals approximately 136 acre-feet of diverted water during the authorized season. This is reasonably close to the 120 acre-feet annual amount limitation. If the diverter were to divert 17 acre-feet per frost event, the maximum annual amount limitation would be reached after approximately 7 frost events. The 7 days of diversion equals the policy area average for the maximum number of frost days between March 15 and March 31 in any one year. The assumption of 8 frost days with direct diversion lasting 10 hours each day is reasonable for use within the policy area. However, if a maximum annual amount limitation is listed on the permit or license, it should be used instead. Additionally, if better information is available for a particular project, it should be used.

3. **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.**

Senior diversions with diversion seasons that extend outside of the policy's season of diversion might not divert the full face value of their water right between October 1 and March 31. A partial face value demand may be applied to these types of diversions when doing a water availability analysis. This partial face value demand may be obtained by prorating the senior demand based on the number of months of diversion between October 1 and March 31 and the number of months of diversion authorized by the permit. This assumption will most likely be used for senior diversions for municipal and domestic uses because those uses tend to be year round.

4. **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.**

Diversions to storage are issued permits or licenses based on the capacities of their reservoirs. Most senior diversions to storage are authorized to collect the volume of water that fills the entire capacity of their reservoir. The conservative approach for the water availability analysis is to assume that the reservoir is empty at the start of each collection season and that the entire capacity of the reservoir is collected each year. This helps ensure enough water remains instream for senior right holders. If better site specific information is available about a diversion, or the senior diversion's permit or license is conditioned to a collection amount different from the storage capacity of the reservoir, that amount shall be used in the demand assessment for the senior diversion.

5. **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 A.2.1.3, unless an alternative method is authorized by the State Water Board.**

Within the policy area, there are senior diversions with large reservoirs with authorized diversion seasons that are longer than the policy's diversion season. In most years these large reservoirs need the majority of their diversion season to fill. A partial face value demand may be applied to these types of reservoirs when conducting the water availability analysis. The partial face value demand may be obtained by prorating the demand for these types of reservoirs based on what is typically collected to storage by March 31. When estimating the demand for a large reservoir, the average monthly amount of water that would be collected to storage for each month between October 1 and March 31 should be considered. If the sum of the average amount collected per month is less than the overall capacity of the reservoir, then in most years the reservoir does not fill by March 31 and only the portion of face value actually collected by March 31 needs to be included in the demand calculation for water availability analysis.