Year type	Roe Island [km 64]	Chipps Island [km 74]	Confluence [km 81]
WetAbove normal Below normal Dry Critically dry	133 days 105 days 78 days 33 days 0 days	148 days 144 days 119 days 116 days 90 days	150 days. 150 days. 150 days. 150 days. 150 days.

¹Numbers indicate the required number of days (based on a 14-day moving average) at or downstream from each location for the 5-month period from February through June. The water year classifications are identical to those included in the 1991 Bay/Delta Plan for the Sacramento River Basin. Roe Island salinity shall be measured at the salinity measuring station maintained by the USBR at Port Chicago (km 64). Chipps Island salinity shall be measured at the Mallard Slough station, and salinity at the Confluence shall be measured at the Collinsville station, both of which are maintained by the California Department of Water Resources. The Roe Island number represents the maximum number of days of compliance, based on the adjustment described in the text.

As explained in more detail in the Proposed Rule, the proposed Estuarine Habitat criteria also included a "trigger" that limited the applicability of the Roe Island criteria to wetter years. This trigger provided that the Roe Island criteria would not apply in a particular year unless and until the average daily salinity at Roe Island attained the 2 ppt level through natural uncontrolled flows. If that occurred, the 2 ppt salinity value would have to be met at Roe Island for the number of days specified in Table 1 (or the number of days left in the February to June period, if that number was less). In effect, this "trigger" provided that the additional water needed to move the 2 ppt isohaline downstream to Roe Island would come from natural storms rather than from reservoir releases or export restrictions. This approach helped the criteria reproduce the natural variability in timing and quantity of runoff that existed during the reference period.

In the Proposed Rule, EPA requested public comment on a number of issues, including the desirability of stating the criteria as a "sliding scale" rather than by water year categories, the appropriate compliance measurement period, and the appropriate reference period for criteria target levels. EPA has incorporated many of the comments received on these and other issues in its revisions to the Proposed Rule.

(2) Technical Changes to the Estuarine Habitat Criteria

The fundamental structure of the Estuarine Habitat criteria in the final rule is unchanged from the Proposed Rule: The criteria require maintenance of the 2 ppt isohaline at or downstream of one of three monitoring sites in Suisun Bay during a specified portion of the February through June period. The final criteria continue to require a 2 ppt salinity value at the Confluence of the Sacramento and San Joaquin rivers each day between February through June in all years.

Virtually all of the changes to the final Estuarine Habitat criteria involve refinements for determining the number of days the salinity standard must be met at Chipps and Roe Islands. In general, these changes either make certain measurements more accurate or provide a closer approximation of the natural hydrological cycles. The changes, which are highly technical, can be grouped into four broad categories: (i) underlying computational revisions, (ii) using a sliding scale, (iii) using monthly rather than annual compliance, and (iv) alternative measurement of attainment of the criteria. These changes to the final rule are reflected in the final criteria at 40 CFR 131.37(a)(1).

(i) Underlying Computational Revisions.

The first group of changes in the final criteria are slight refinements to the methodology of some of the computations used in the rule. These include:

(I) Updated model correlating salinity and flows. As described above, the Proposed Rule used data from the historical period 1940 to 1975 to approximate conditions in the targeted late 1960's to early 1970's reference period. For years during that historical period when actual salinity data was unavailable, the Proposed Rule used the Kimmerer-Monismith model to estimate salinity conditions based on the available flow data. This earlier model, which was used by the San Francisco Estuary Project (SFEP) (SFEP 1993), was considered at that time to be the most accurate available for this purpose. Since the Proposed Rule was published, a revised model correlating salinity and flow has been developed by the CCWD (Denton, R.A. 1993, and Denton, R.A. 1994). EPA concluded, and the participants at the CUWA scientific workshops generally agreed (Kimmerer 1994b), that the CCWD model is a more appropriate model to use in developing

the Estuarine Habitat criteria.¹⁵ The final rule will use this new CCWD model to estimate the number of days that salinities have been less than 2 ppt historically at each of the compliance monitoring stations.

The earlier model used for the Proposed Rule measured salinity one meter above the bottom. The new CCWD model measures salinity measured at the surface. There is substantial evidence that at salinities near 2 ppt there is little variability in stratification so that bottom salinities are accurately predicted from surface salinities (CCWD 1994; Monismith 1993). Therefore, bottom salinities of 2 ppt as modeled by the Kimmerer-Monismith model correspond to surface conductivities described, as discussed below, in terms of electroconductivity of 2.640 mmhos/ cm EC in the CCWD model.

(II) Use of entire basin unimpaired flow. In calculating the applicable Estuarine Habitat criteria value, the Proposed Rule measured flow by reference to the Sacramento Basin Water Year Type classification. EPA did this primarily to simplify calculations and to reflect the dominant role of Sacramento River flows in the Bay/Delta estuary.¹⁶ Nevertheless, as commenters noted, in some circumstances the omission of the San Joaquin River basin flows from the calculation could significantly overstate

¹⁶The Sacramento River basin usually accounts for about 80% of net Delta outflow, with the remainder coming primarily from the San Joaquin River basin.

¹⁵ The CCWD model developed by Denton and Sullivan models salinity at a particular location, whereas the Kimmerer-Monismith model models the location of a particular salinity. Thus, the Kimmerer-Monismith model can predict whether the 2 ppt salinity value is upstream or downstream of a given location whereas the CCWD model can predict if the salinity at the same point is greater or lesser than 2 ppt. The CCWD model is more accurate because it predicts salinity based not only on flow (as in the Kimmerer-Monismith model) but also based on the location being modeled. For example, the relationship between flow and salinity is slightly different at Roe Island than at the Confluence, and only the CCWD model reflects that difference in the relationship.