(2) Proposed Criteria. As stated in the Proposed Rule, the Estuarine Habitat criteria consisted of three interrelated components:

(i) A salinity requirement of 2 parts

per thousand (2 ppt);

(ii) Maintained at one or more of three monitoring locations in the Suisun Bay;

(iii) For a specified number of days during the critical spring months. These criteria were designed to reflect the conditions in the estuary at a time when it attained protection of the designated Estuarine Habitat use.

As a preliminary matter, EPA determined the "reference period," the historical time period during which the salinity regime in the estuary was sufficient to protect the designated uses. To determine the reference period, EPA was guided by the Interagency Statement of Principles signed by EPA, USFWS and NMFS, which called for estuarine conditions similar to the late 1960's to early 1970's as necessary to protect the Estuarine Habitat. However, the decade from 1965 to 1974 did not include water years types from each of the five water year type categories.9 Therefore, in order to estimate those conditions over the entire range of possible hydrological conditions that may occur in the future, EPA used data from the years 1940 to 1975 to represent the conditions in the reference period of the late 1960's to early 1970's, and used this larger set of historical data to determine the minimum number of days of compliance.

As explained in more detail below and in the preamble to the Proposed Rule, EPA then focused on the salinity regime in the estuary to develop criteria that protect the Estuarine Habitat. Salinity was selected for several reasons: it is closely associated with the abundance and distribution of species at all trophic levels, it can be measured accurately and easily, and it integrates a number of important estuarine properties and processes.

Salinity conditions in the estuary vary dramatically from month to month and year to year, primarily in response to natural factors such as precipitation and snowmelt upstream, and to man-made factors such as reservoir operations, upstream diversions and export rates. EPA concluded that maintaining salinity conditions reflecting the natural hydrology in the Bay/Delta during the reference period would provide estuarine habitat conditions that protect the fish and wildlife resources

dependent on that habitat. In other words, because precipitation varies naturally from year to year and within each year, salinity conditions reflecting this natural variability at a time period when the Bay/Delta attained its designated uses would protect the natural resources dependent upon estuarine habitat. While it may seem counterintuitive to provide less fresh water to the estuary in a dry year, and more water in a wet year, the natural resources in the Bay/Delta ecosystem have adapted to the cycle of both within-year hydrological fluctuations and substantial year-to-year fluctuations in hydrology. The intent of the proposed criteria was to restore a pattern and magnitude of those hydrological fluctuations that reflected the historical period during which the designated

uses were fully protected.

To provide these conditions, EPA proposed maintaining the low salinity 10 2 ppt isohaline (an isohaline is simply a line joining all points of equal salinity) in Suisun Bay during the critical wet season months of February to June. This particular time period is important because many different species use the low salinity habitat in the spring for spawning, as nursery habitat, for transportation through the Delta, or for a combination of these three purposes. To take account of the variation in natural hydrological conditions, EPA proposed criteria that varied according to the water year type. In all water years, the 2 ppt salinity criteria would be met at the furthest upstream monitoring site (the confluence of the Sacramento and San Joaquin Rivers at the upstream end of Suisun Bay). In wetter years, the 2 ppt salinity criteria would also be met at one or both of two downstream monitoring sites (Chipps Island and Roe Island, in the middle and downstream end of Suisun Bay, respectively).

The proposal was stated as requiring attainment of the 2 ppt salinity criteria at or below one of the three monitoring sites for a specified number of days during the February to June period, depending on the water year type. For example, under the Proposed Rule, in a 'below normal" water year, the 2 ppt isohaline would have been required at or downstream of Chipps Island for a total of 119 days during the February to June period. This "number of days"

approach allowed the criteria to be responsive and replicative of the varying natural hydrology during February to June. That is, if February or March were particularly wet, the criteria's "number of days" could be met at that time using those natural storm flows, rather than requiring reservoir releases later in the February to June period.

Finally, again in an attempt to match the criteria with the natural hydrology, the Proposed Criteria included a "trigger" for compliance with the farthest downstream monitoring site (Roe Island). Compliance at that site would not be required unless and until the 2 ppt isohaline had been pushed that far downstream through natural storm events.

(3) Final Criteria. The Estuarine Habitat criteria in the final rule have been revised to address many of the technical issues raised in the public comments. The fundamental structure of the Estuarine Habitat criteria is unchanged: The criteria require maintenance of the 2 ppt 11 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. The 2 ppt salinity value is to be met at Chipps Island for a specified number of days, depending on the amount of precipitation. The greater the precipitation, the higher the number of days the criteria must be attained. The 2 ppt salinity value must be met at Roe Island only if it is triggered by precipitation sufficient to push the 2 ppt salinity value downstream to Roe Island during the last half of the previous month. Once triggered, the 2 ppt salinity value is to be met at Roe Island for a specified number of days, depending on precipitation.

The changes to the final criteria are primarily refinements to how the rule determines the number of days the salinity standard must be met at Chipps and Roe Islands. The primary revisions include:

^{9 &}quot;Water year" type categories in California refer to precipitation patterns for the year. The standard water year categories are wet, above normal, below normal, dry, and critically dry years.

¹⁰ Low salinity in the 2 ppt range is being used to describe salinity conditions in the "mixing zone" between freshwater coming downstream and marine water moving inland from the ocean in response to tidal influences and fluctuations in freshwater outflow. This mixing zone generally contains low surface salinity of 1 to 6 ppt, whereas ocean salinity is over 30 ppt and freshwater salinity is generally less than 1 ppt (Arthur and Ball 1979).

¹¹The Proposed Rule stated the criteria as a requirement for 2 ppt salinity. As discussed more fully below, in order to state the requirement more precisely, the final rule language will define the criteria in terms of micromhos per centimeter specific conductance at 25 °C instead of parts per thousand salinity. Accordingly, the final rule will state the criteria value as "2640 micromhos/cm, which is equivalent to 2 ppt salinity. Although EPA is restating the actual rule language in the more precise specific conductance language, it will continue to refer to this criteria value as 2 ppt in this discussion of the final rule.