



Reach 2B Floodplain Habitat Acreages

Purpose

This memo provides a comparison of the amount of floodplain habitat included in the Reach 2B alternatives and the floodplain habitat need described in the *Minimum Floodplain Habitat Area 1* report.

Floodplain Habitat Provided in the Alternatives

The Reach 2B Project Description² describes the alternatives that will be assessed for environmental consequences during the preparation of the Project Environmental Impact Statement/Environmental Impact Report (EIS/R). The alternatives include two different floodplain widths (Narrow and Wide) created by setting back levees along the river channel. They also include two different methods of bypassing Mendota Pool (Compact Bypass and Fresno Slough Dam). Each floodplain width was combined with each bypass method to create four different alternatives. Each alternative provides varying amounts of floodplain and associated channel fish habitat, which also varies by flow.

The floodplain widths were selected during an alternatives evaluation process which looked at the amount of direct rearing and indirect rearing habitat provided for Chinook salmon. The evaluation considered the inundation frequency, duration, and timing of various flows as well as the physical conditions provided on the floodplain (depth and velocity). Hydraulic modeling (1D and 2D) was used to quantify the depths and velocities on the floodplain and in the channel at various flows. The alternatives evaluation did not include fish population modeling, but instead focused on the amount of good quality habitat that could be provided given the amount of flow to be expected in Reach 2B. Based on potential restoration flow hydrograph scenarios, a flow of approximately 2,500 cubic feet per second (cfs) was determined to represent a rearing habitat activation flow that met minimum frequency, duration, and timing criteria. For comparison, the channel and floodplain are designed to convey a maximum flow of 4,500 cfs.

Recommended Minimum Habitat

The *Minimum Floodplain Habitat Area* report recommends a minimum amount of juvenile rearing habitat necessary to meet fall- and spring-run Chinook salmon population targets for the San Joaquin River Restoration Program. Rearing habitat includes both main channel and floodplain habitat and provides physical parameters such as food and shelter to support the development and growth of juvenile fish. The Program's population targets are 30,000 adult spring-run and 10,000 adult fall-run Chinook salmon returning to the river in the population growth stage, and 45,000 adult spring-run Chinook salmon and

¹ SJRRP 2012. *Minimum Floodplain Habitat Area for Spring and Fall-Run Chinook Salmon*. November.

² SJRRP 2012. *Mendota Pool Bypass and Reach 2B Improvements Project – Project Description Technical Memorandum*. October.

15,000 adult fall-run Chinook salmon as long-term population targets.

Starting with the population targets, four analyses were performed to build an estimate of the minimum rearing habitat requirements for fall- and spring-run Chinook salmon. First, the Emigrating Salmonid Habitat Estimation (ESHE) model was used to simulate the juvenile stages of future restored populations and to estimate their required reach-specific amount of suitable habitat. Second, 2D hydraulic modeling estimated the amount of already-available suitable habitat in each reach. Suitable habitat is the amount of inundated acreage that meets depth, velocity, and cover requirements for Chinook salmon. Third, the suitable habitat deficit was calculated by subtracting the available suitable habitat (step 2) from the required suitable habitat (step 1). Fourth, the total inundation area needed was calculated by dividing the suitable habitat deficit (step 3) by the percent of the floodplain that has suitable habitat. Detailed discussion of the analyses methods and inputs can be found in the corresponding report(s).

Comparison

The table below provides a comparison of the acreages provided and needed.

Based on the data provided in table below, the Compact Bypass with Wide Floodplain and Bifurcation Structure at 2,500 cfs provides 100 percent of the recommended minimum habitat (assuming 25 percent of the floodplain is suitable habitat) for the San Joaquin River from Reach 1 through Reach 3. At 4,500 cfs, this alternative as well as the Fresno Slough Dam with Wide Floodplain and North Canal each provide 100 percent of the recommended minimum habitat (assuming 20 percent of the floodplain is suitable habitat). At 4,500 cfs, the two Narrow Floodplain alternatives provide nearly 100 percent of the recommended minimum habitat assuming 25 percent of floodplain is suitable habitat. However, neither of the Narrow Floodplain alternatives meets 100 percent of the floodplain habitat needs at any suitable habitat level.

Alternative	Floodplain (ac)		Channel (ac)		Total (ac)		Recommended Minimum Habitat (ac) [*]			
	at 2,500 cfs	at 4,500 cfs	at 2,500 cfs	at 4,500 cfs	at 2,500 cfs	at 4,500 cfs	10% Suitable [†]	15% Suitable	20% Suitable	25% Suitable
Compact Bypass with Narrow Floodplain and South Canal	862	1,073	536	586	1,396	1,659	4,160	2,770	2,080	1,660
Compact Bypass with Wide Floodplain and Bifurcation Structure	1,163	1,572	523	579	1,686	2,151				
Fresno Slough Dam with Narrow Floodplain and Short Canal	763	1,036	463	553	1,226	1,589				
Fresno Slough Dam with Wide Floodplain and North Canal	1,060	1,610	451	543	1,511	2,153				

^{*} Includes floodplain habitat needs for Reaches 1, 2A, 2B, and 3 because the analysis assumed that additional floodplain would not be built in these reaches other than Reach 2B.

[†] Percent suitable refers to the percentage of the total inundated acreage that is suitable habitat. The lower percent suitable, the greater the total inundated acreage needed to provide the minimum fish habitat.