

RECLAMATION

Managing Water in the West

Eastside Bypass Improvements Project – Wetlands Offset Analysis

San Joaquin River Restoration Program
Mid-Pacific Region



Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Purpose

The purpose of this analysis is to determine the approximate acreage of wetlands on Merced National Wildlife Refuge land that are affected by the change in flow conditions due to the presence of Restoration Flows in the Eastside Bypass. Specifically, this analysis aims to approximate the acreage of wetlands that would be affected due to the inability of the Refuge to operate their weirs and a portable pump. Once the acreage of the affected wetlands is determined, it will then be compared to the potential wetland habitat available in the Snobird Unit (part of Merced NWR).

Methods

First, the total acreage of inundated area upstream of the weirs was calculated to approximate the maximum extent of wetlands that could have occurred during historical operations of the weirs. HEC-RAS v4.1 and ArcGIS v10.4 (with the HEC-GeoRAS extension) were utilized to conduct this analysis. This analysis assumed two scenarios; one where the weirs are at full boards (98') and one where the weirs are at partial boards (96'). LiDAR flown in 2015 by the SJRRP was used as the surface data in this analysis. The difference in elevation between the water surface and the LiDAR data determined the extent of inundation behind the weirs. Acreages for inundated areas were calculated upstream to El Nido Road, which is the southern extent of the Merced National Wildlife Refuge. Once the total acreage of inundation was determined, the inundated areas were then separated into 3 inch depth increments (3", 6", 9", etc.), which represent varying habitat and wetland types suitable for various waterfowl and waterbird species (Figures 1 & 2). For visual extents of floodplain inundation see the attached 'Full Boards in Mapbook' and 'Partial Boards Mapbook'.

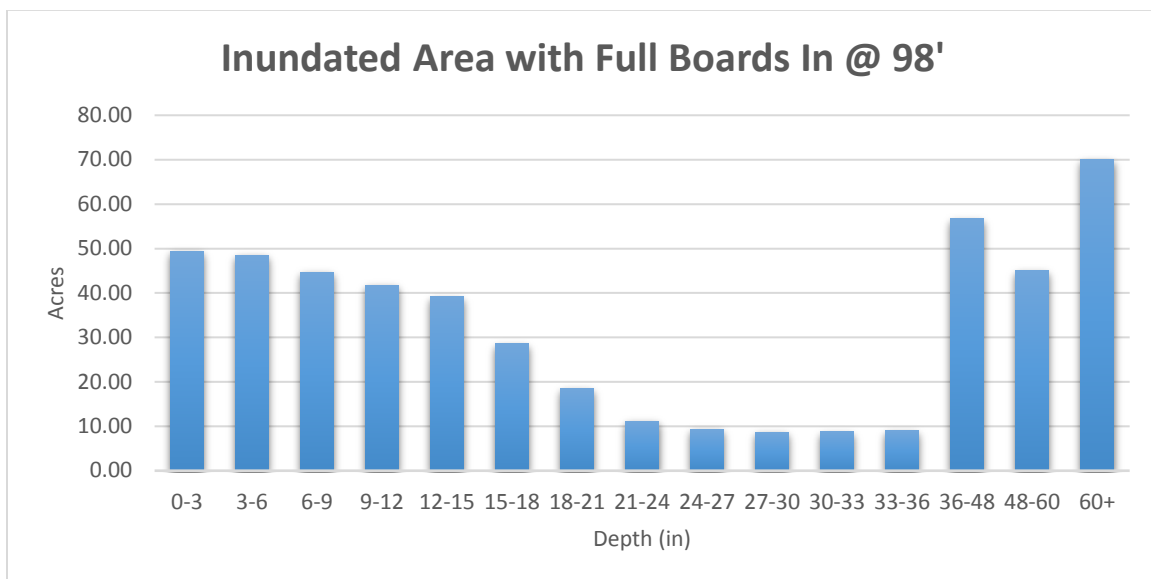


Figure 1. Inundated floodplain area with boards in at 98 feet.

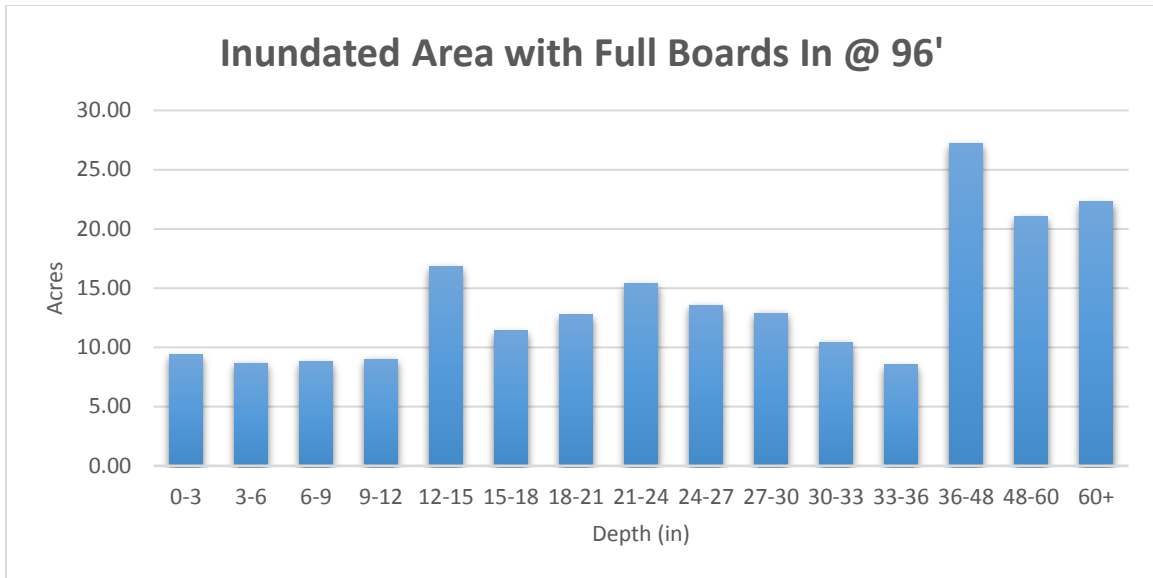


Figure 2. Inundated floodplain area with boards in at 96 feet.

Second, the total acreage of wetlands upstream of the weirs was calculated to approximate the typical extent of inundated floodplain during fall and winter base flows (Oct. – Feb.), which range between 115 – 175 cfs. These flows were chosen because they coincide with when the Refuge would need shallow water wetland habitat and these flows are consistent over all restoration year types except for critical years. This analysis assumed that all boards are removed from the weirs (equivalent to the complete removal of the weirs with the berm intact) and that the water surface elevation would correspond to the flow in the Eastside Bypass. For the purposes of this analysis the steady flow was set to 150 cfs. The same surface data was used to determine the extent of inundated floodplains available during this condition. Wetland habitat was classified with the same depth categories (Figure 3). For visual extents of floodplain inundation see the attached ‘Weirs Out in Mapbook’.

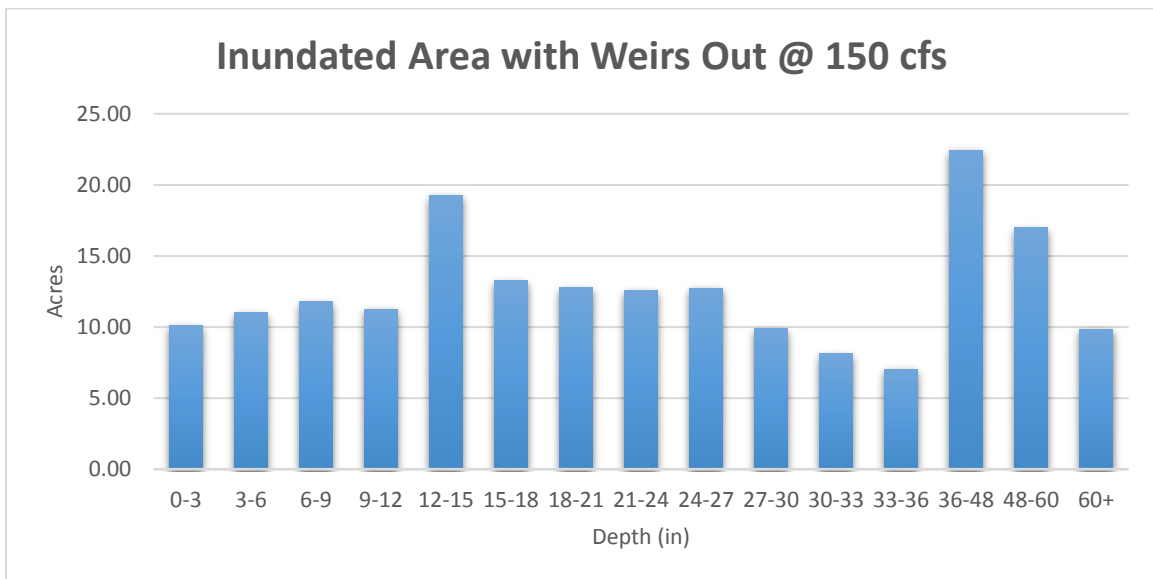


Figure 3. Inundated floodplain area with Weirs Out at 150 cfs.

The main concern of the Refuge was the loss of shallow water habitat in the Middle Eastside Bypass. Shallow water habitat is defined by the Refuge as being inundated with 18” or less of water. Table 1 shows the total shallow water wetland habitat for each of the scenarios. The difference in total shallow water wetland habitat between the full boards scenario (98’) and the weirs out scenario is a net loss of approximately 175 acres. The partial boards (96’) scenario has a similar extent of shallow water wetland habitat when compared to the weirs out scenario.

Depth (in)	Inundated Area @ 18" of Depth or Less (acres)		
	Boards In @ 98'	Boards In @ 96'	Weirs Out @ 150 cfs
0-3	49	9	10
3-6	49	9	11
6-9	45	9	12
9-12	42	9	11
12-15	39	17	19
15-18	29	11	13
Total (acres)	252	64	77

Table 1. Total shallow water wetland habitat calculated for each scenario.

Lastly, the extent of wetlands available at the Snobird Unit was estimated using spatial information provided by the Refuge, which was calculated to be approximately 164 acres (Figure 4). It was assumed that the Refuge would be able to closely manage these wetlands similarly to how other wetlands on the Refuge are managed for shallow water wetland habitat.

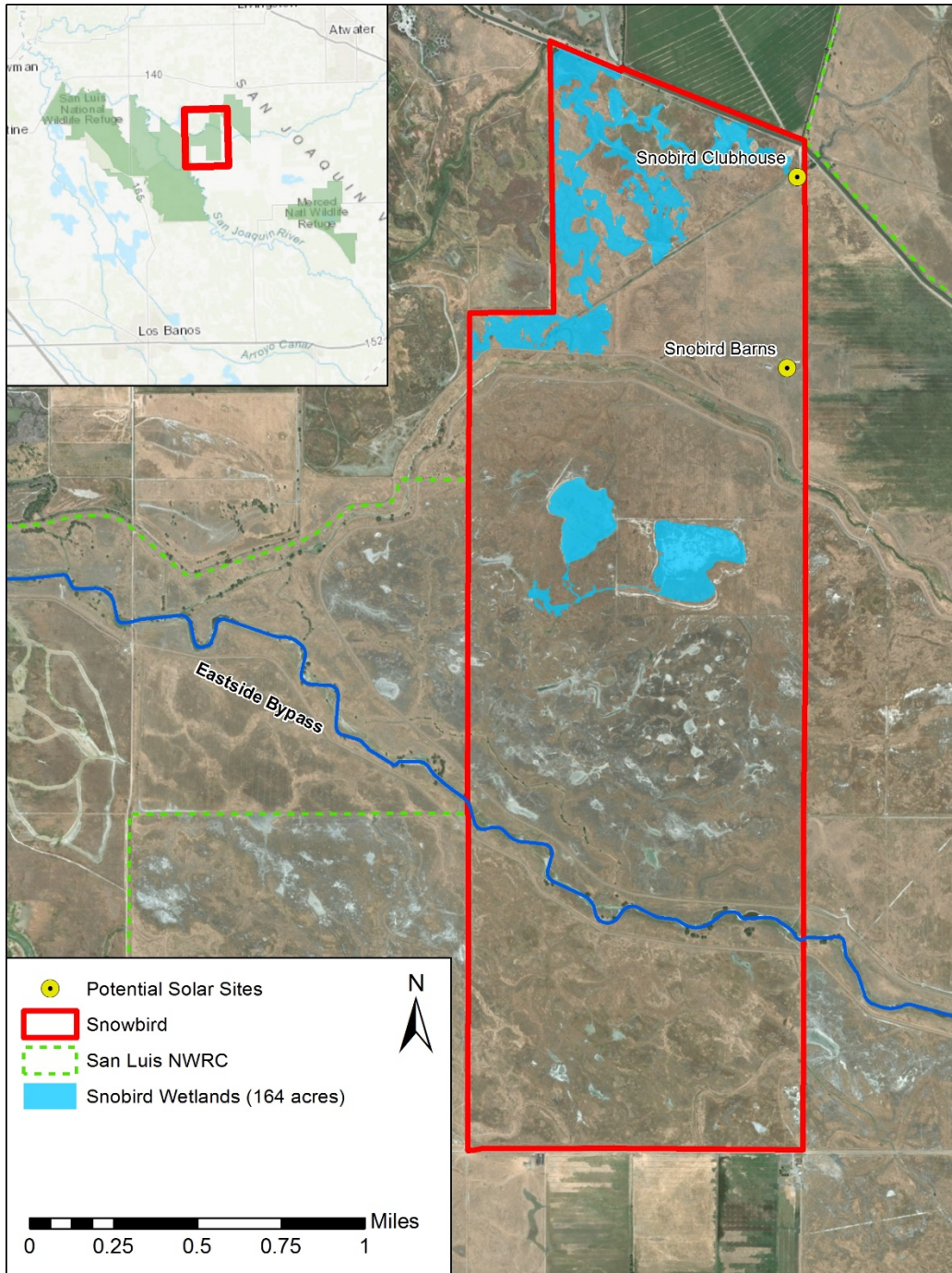


Figure 4. Extent of managed wetlands in the Snobird Unit (Merced NWR).