

*** Use of Two Dimensional Hydraulic and Sediment Transport Modeling in Design of Salmonid Rearing Habitat in the Sacramento River Floodplain**

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Abstract: Impacts associated with construction of a pump station to replace the Red Bluff Diversion Dam on the Sacramento River will be mitigated through construction of a three-quarter mile long, 23 acre perennial, off-channel open water and riparian wetland habitat in East Sand Slough, an off-channel area immediately adjacent to the Sacramento River. Since the 1960s, East Sand Slough has been inundated annually by backwater from Red Bluff Diversion Dam. The new off-channel habitat area will be connected to the main stem Sacramento River at low flow in three locations. The design for the habitat contains open water, riverine wetlands, and riparian shrub scrub environments intended to support habitat for rearing fish and establish native vegetation communities adapted to the site conditions. The design analyses required an understanding of the complex hydraulic and sediment flow patterns at both these connection sites and in the newly constructed channel to understand habitat conditions and avoid maintenance problems due to erosion or sedimentation that could threaten the long-term viability of the constructed habitat. We used the hydrodynamic and sediment transport modules of the Bureau of Reclamation's SRH2D model to simulate a range of flow events in the proposed design configuration. We were able to validate the hydraulic and sediment transport predictions of the model by comparing existing conditions model results with sediment transport data collected during an approximately 5-year flow event, which occurred on Sacramento River towards the end of the design process (approximately 95,000 cfs in March 2011).