

RESTORATION OF LOWER LAS VEGAS WASH – UPPER DIVERSION WEIR

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Abstract: Las Vegas Wash is a tributary to Colorado River that drains into Lake Mead. The Wash naturally would be an ephemeral system with the infrequent summer storms being primarily responsible for forming the channel and transporting sediment. However, the Wash has been a perennial system since the 1950s as a result of continuous effluent flows, which have increased fairly significantly over time due to increased urbanization. The increased flows resulted in the initiation of bed and bank erosion in the late 1960s, and severe headcuts and channel incision were evident in the 1970s. The progression of the headcuts and channel incision was accelerated when culverts near the downstream end of the wash were replaced with a bridge in 1978. Also, the Wash experienced multiple large storm events in the early 1980s. The Wash during this period degraded up to 35 feet and widened up to 520 feet, resulting in the destruction of most of the historical wetlands in the lower Wash, large amounts of sediment depositing into Lake Mead, and the decline of the Wash aesthetics. It has been estimated that approximately 4 million cubic yards of sediment eroded from the Wash during the 15-year period prior to 1984.

Due to growing concerns over water quality issues in Lake Mead and the Wash, the Nevada Division of Environmental Protection (NDEP) initiated the Lake Mead Water Quality Forum (Forum) in 1997. A Water Quality Citizens Advisory Committee (WQCAC) was established in 1997 by the Southern Nevada Water Authority (SNWA) to provide the Forum with public input and recommendations in the area of water quality. This committee recommended that a comprehensive adaptive management plan for the Wash be developed, with SNWA as the lead agency in implementing the plan. The Las Vegas Wash Coordination Committee (LVWCC) was established by SNWA to develop this plan.

The adopted plan includes the construction of twenty-two grade control structures and the establishment of wetlands habitat for the reach between Lake Las Vegas, which is just upstream of Lake Mead, and the Nature Center located about 6.6 miles upstream. The upstream most structure, Upper Diversion Weir, is currently being designed by Louis Berger Group, Inc. and WEST Consultants, Inc. This structure will be a concrete grade control structure that will divert water to the existing Wash and an outfall channel. As part of the design efforts, an HEC-6 model was developed for the upper 5.2 miles of the lower reach of the Wash. The model was used to evaluate the effect the grade control structures proposed in this reach would have on the stability of the wash and the impacts to the downstream sediment load for two hydrologic conditions: 20-year of effluent flows and flood series. The HEC-6 results indicate that (1) the proposed weir structures will significantly reduce the amount of degradation within the study reach and the sediment discharge passing the Pabco Weir; (2) the bed load sediment discharge will be reduced about 85%, and the suspended sediment discharge will be reduced about 60%; (3) significant aggradation will occur upstream of the weir structures; and (4) about 1 to 2 feet of sediment will deposit upstream of the Upper Diversion Weir in 20-years.