



Klamath Natural Flow Study

Hydraulic Modeling

Model Purpose

The hydraulics component includes several tasks relating to the surficial movement and storage of water. To simulate natural flow the following tasks are being completed:

- Build two-dimensional (2D) hydraulic models
 - Model flows out of Upper Klamath Lake (UKL), flow losses from the Klamath River (KR) through the Lost River Slough (LRS), and estimate exchanges between the KR and Lower Klamath Lake (LKL)
 - Purpose: To establish a rating curve for flows out of UKL, a rating curve for KR losses through the LRS, and a reference table for flow exchange between the KR and LKL
- Produce area-capacity (ACAP) tables for UKL, LKL, and Tule Lake to understand how the volumes, surface areas, and water surface elevations are related to one another under current and undeveloped conditions
- Use previously developed models to inform channel roughness estimates for streamflow routing in RiverWare

Model Selection and Input Data

Reclamation's Sedimentation and River Hydraulics model (SRH-2D) is being used for 2D modeling. Established methods for calculating ACAP tables are being used. For both 2D modeling and ACAP tables, developed (current) conditions topography is being combined with the best available historical information to calculate natural flows under undeveloped conditions. The conceptual diagram (backside) depicts the relationships between input data, modeling methods, and outputs.

Natural Flow Representation

Several changes to topography are being made to represent undeveloped conditions in rivers, floodplains, and lakes for the hydraulics portion of the study. Major changes include:

- Removal of levees, canals, drains, and dams
- Raising of terrain to historical elevations to account for subsidence and engineered blasting
- Accounting for historically mapped wetlands

Uncertainty Analysis

Uncertainty of marsh elevations and model roughness were tested to improve model and ACAP results.

Model Products

Final product provides information on how to calculate natural flows leaving UKL, flow transferred to LRS and LKL, as well as flow to Keno, OR and to Iron Gate Dam.

Key References

Henshaw, F.F. & Dean, H.J. 1915. Surface Water Supply of Oregon 1878-1910.

Lippincott, J.B., Murphy, D.W., & Humphreys, T.H. 1905. Topographic and Irrigation Map of the Upper and Lower Klamath Projects.

Weddell, B.J. 2000. Relationship Between Flows in the Klamath River and Lower Klamath Lake Prior to 1910.

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Hydraulics Overview

