

# Crystal River Hatchery Habitat Restoration Project - 2021-2022

*Client:* Colorado Parks and Wildlife

*Owner:* Colorado Parks and Wildlife

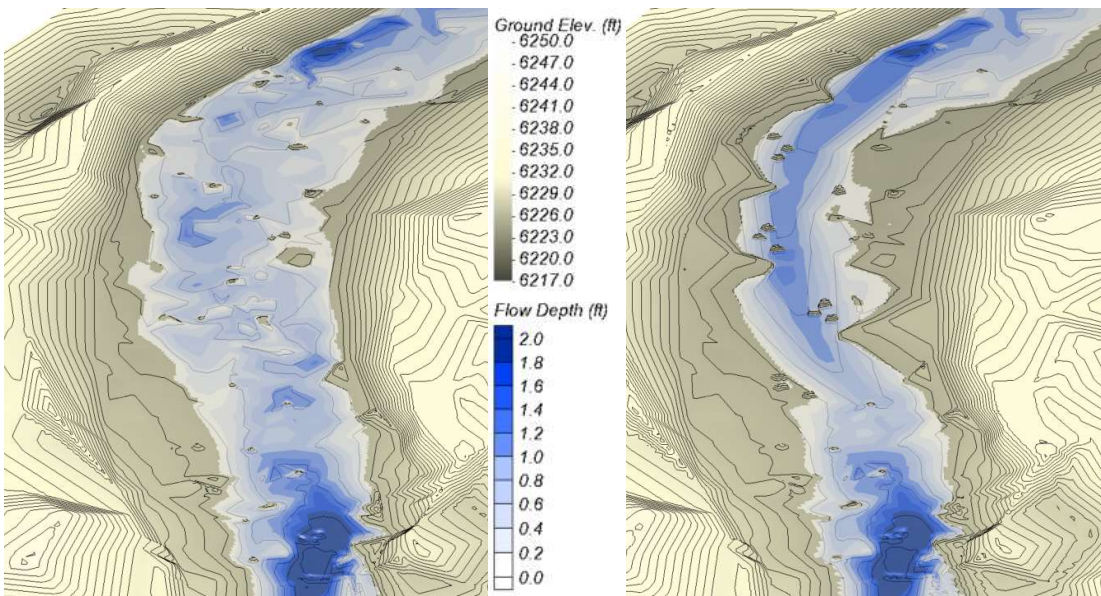
*Project Location:* Crystal River, Carbondale, Colorado

*Name of Project Manager/Engineer:* Scott Prins, PE

**Brief Description of Project:** The primary purpose of the Crystal River Hatchery Habitat Restoration project was to improve aquatic habitat and fish passage connectivity during low flow periods. The project focused on a wide shallow area of channel which currently lacks any deeper flow habitat during low-flow periods. The existing channel directly upstream and downstream of the project contain sufficient low flow depths and diversified habitat. The project improvements connected these to establish more-continuous low-flow habitat for native and local fish populations. The improvements were designed to have the desired impact during low flows and also to avoid impacting recreational use of the reach during higher flow rates.

To address the project goals, the proposed improvements included the re-grading of the riverbed to establish a more-pronounced thalweg and the construction of four low-elevation boulder vane structures to focus flows into the new thalweg during low flows help minimize deposition of cobbles during high flows. The project also included the placement of habitat boulders throughout the area of impact to further enhance habitat and improve depth connectivity during low flow periods.

The project team worked on all aspects of the project; including collection of topographic and hydrographic survey data; development of concept designs for communication with stakeholder and river users; hydraulic design using AutoCAD Civil 3D, SRH-2D, and HEC-RAS; permitting with the USACE under NWP-27 and obtaining local floodplain and grading



*SRH-2D Hydraulic Model of Existing and Proposed Conditions – 48 cfs*



permits; development of construction documents; and bid support. The team developed an innovative and design that has successfully demonstrated the project intent with a natural function and aesthetic. The project improved low-flow depth connectivity for fish passing through the reach and also improved localized habitat for resident fish species.