

# Linn Grove Dam and Park Restoration Project - 2021-Current

*Client:* Emmons & Olivier Resources, Inc. (EOR)

*Owner:* Buena Vista County Conservation Board

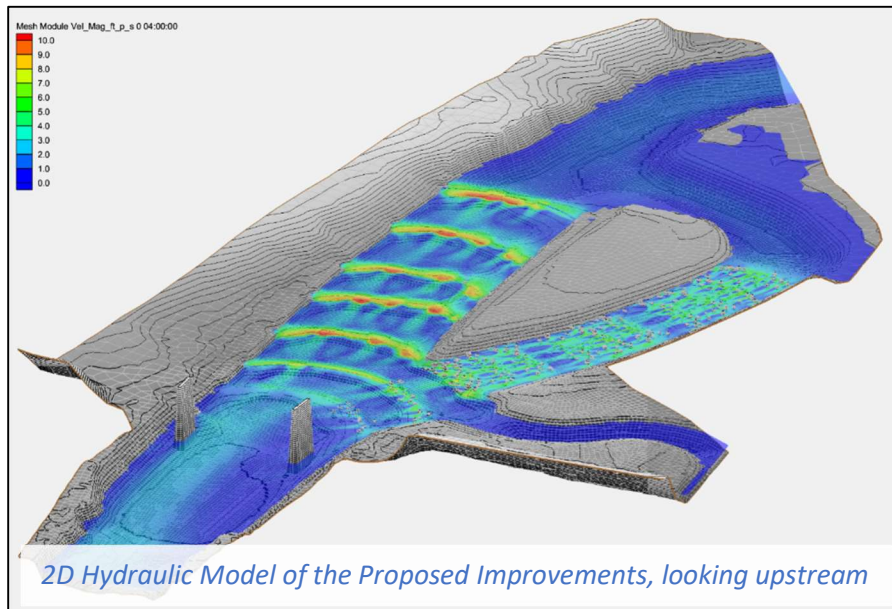
*Project Location:* Little Sioux River, Linn Grove, IA

*Name of Project Manager/Engineer:* Quinn Donnelly, PE

**Brief Description of Project:** In March 2019, a large flood event on the Little Sioux River caused scouring and erosion around the historic, 10-foot tall, 210-foot long Linn Grove Dam, resulting in a new channel along the south side of the structure, complete washout of the Linn Grove Dam Park access road, and massive sediment deposits downstream. As part of an ongoing project, RiverRestoration teamed with EOR, a civil consulting firm based out of St. Paul, MN, to reconstruct the river through the project reach, develop a design to provide boat passage in the historic (north) channel and fish passage in the scoured (south) channel while protecting-in-place the historic dam. RiverRestoration was responsible for complete hydraulic design and analysis of both the north and south channels at varying flow rates. The design of the south channel's rock arch rapids involved extensive coordination with the Iowa Department of Natural Resources to ensure that target velocities and water depths were met for resident species such as walleye, channel catfish, and northern pike. In the north channel, a series of seven boulder grade control structures were designed to accommodate Class III whitewater navigation of personal watercraft such as canoes, kayaks, tubes, and standup paddleboards for a section of river previously unnavigable due to the presence of the dam. The design was developed using two-dimensional (2D) hydraulic models of the project reach, and factored in water depths, water velocities, and shear stresses for the full range of the hydrograph. The water level created by the existing dam before failure is to be restored, due to wetland enhancement projects upstream that depend on the raised water. Designing riffles and rapids in a sand bed channel system presented challenges, which were overcome through a detailed sediment transport analysis. Using the 2D model and the sediment transport analysis as a guide, the design incorporates hydraulic elements to prevent fine sediment deposition in key habitat and aquatic passage locations, and boulder structures were sized to remain stable during the extreme high flow events the site can see.



*River routed left around dam structure in 2019 storm.*



*2D Hydraulic Model of the Proposed Improvements, looking upstream*

Other project elements include a new boat ramp, a new habitat channel to the southwest, a regraded "island" between the north and south channels, and multiple river access points. The project is currently awaiting funding approval from FEMA and construction is expected to be completed by late 2025.