



Project 1-3: Pilot Exploration of Lake-Clay Bluff/Bank Management & Water Storage in the Lower Knife River Valley, Knife River Minnesota

Background: Groundwater discharge provides the essential fluid habitat needed for a trout stream and is necessary to maintain a cold water fishery. An active floodplain that receives over-bank flows provides bank storage and groundwater recharge.

Problem Statement: Over the last century, land use and perhaps climate change in the Knife River system has resulted in lower and warmer base stream flow. This condition adversely impacts trout survival and limits their mobility through the main stem of the Knife River. A secondary, but important water quality issue is the current sediment discontinuity in the lower Knife River.

Goals: Researchers from the WRS program, University of Minnesota propose testing the viability of enhanced groundwater recharge and alluvial aquifer water storage in the Eric & Deanne Furo reach (4-5000-m). The reach contains a relatively wide alluvial aquifer that may be up to 12-m thick; this reach also contains a large eroding bluff that contributes sediment nearly year-round to the river. We propose the following steps:

1. Define the aquifer characteristics and connectivity with the Knife River under varying flow conditions using geophysics and direct observation,
2. Model and monitor snow-melt runoff enhanced aquifer recharge pathways and hydraulic residence using MODFLOW and stable isotopes,
3. Model channel relocation and sediment response using CONCEPTS,
4. Develop a plan that optimizes the pros of the study results,
5. Implement a pilot bluff/riparian/channel re-construction,
6. Install an effectiveness monitoring regime to evaluate project success.

A written report explaining aquifer & runoff characteristics, modeling and monitoring results and recommendations that highlight the optimal channel re-construction options will be developed. From the report an implementation plan will be produced that guides earth moving contractor work. An effective monitoring plan to evaluate the success of implementation activities will also be described in the report.

Priority: High

Task Duration: 3 years

Potential Mechanism: LSOHC, CWL, GLRI

Potential Partnering Organization(s): DNR, PCA, SWCD, LSSA, landowners

Estimated Cost: \$ 240,000 over 3 years

Comments: Turned into other funding sources as well.

Special Considerations:

Accomplishments:

Measure(s) of Success:

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Vision Statement: Maintain, protect, and restore healthy cold water ecosystems with relatively stable flows and a diversity of habitat for fish and wildlife to enhance our quality of life.

For project information: www.lrcd.org/links/lsc_projects.htm