

BY CRAIG WILSON

Craig Wilson is the owner of Environmental Troubleshooters Inc.

THE REHABILITATION OF A RIVER

The Knife River, about a 19-mile drive up the North Shore from Duluth, once held one of the largest populations of naturally-reproducing steelhead in the Great Lakes. However, since the early 1970s, the Knife River's steelhead population has experienced a dramatic decline. One of the reasons for this decline is habitat loss.

The Lake Superior Steelhead Association (LSSA) was formed 40 years ago by local fishermen out of growing concern that this trout fishery was in serious decline. The LSSA's primary purpose is to promote the healthy propagation of trout and other cold-water fish. After 40 years of conservation work in the Knife River Watershed, the LSSA received a Lessard-Sams Outdoor Heritage Council grant in 2012 and in 2014. This grant was provided to rehabilitate steelhead habitat in the upper Knife River.

Thanks to LSSA's 2016 Knife River project, over 2,000 lineal feet of stream have been rehabilitated to help protect and promote a healthy fish population in the river. Clean water and abundant fish are not only important for the environment and wildlife; they're important to our region's tourism, outdoor recreation and sports industries. They're also important

to all of us who choose to enjoy living and working in the Northland.

The LSSA's Knife River steelhead rehabilitation project utilized a restoration technique called Natural Channel Design (NCD). NCD methodology not only aims to rehabilitate trout habitat, but also restores the stream's channel so the stream functions at a more stable state.

NCD uses a stepwise process to

bring a stream section or reach-back to a stable functioning state. The first step is to perform a rapid assessment to identify impacted stream reaches. Once the impacted stream reaches are identified, the potential projects are prioritized and ranked, based on their ability to improve both water quality and trout habitat. Projects that can satisfy both restoration criteria are selected for rehabilitation.

Once an impacted section of stream is selected for rehabilitation, a detailed assessment and survey is performed to collect data to compare the degraded stream reach to more stable stream reaches. The assessment data collected for this project included: stream width-to-depth ratios, bank-full elevation, erosion calculations, longitudinal profile, cross-sectional elevations and pebble counts.

After the assessment and survey are completed, the project's goal is to restore the impacted stream channel back



THE USE OF THESE NATURAL MATERIALS NOT ONLY STABILIZES THE STREAM, BUT ALSO PROVIDES IMPORTANT SUBSTRATE FOR TROUT AND OTHER AQUATIC LIFE.



to a stable condition. This is accomplished by creating new floodplain and streambank elevations, realigning the stream's shape and configuration, resizing the channel dimensions and profiling and installing trout habitat features.



The creation of these new stream features allows the floodwaters to crest the new streambank instead of eroding the face of an unstable slope. The result is a stream with a narrower and deeper channel. This new channel design transports sediment to maintain deeper pools, which ultimately provide significantly better trout habitat.



Historic stream projects used standard construction techniques like rip-rap banks, concrete dams, steel weirs and metal culverts. NCD restoration projects use only natural

materials, such as tree trunks, root wads, brush bundles, boulders, coconut matting, straw bales, soil and seed as the raw construction materials. The use of these natural materials not only stabilizes the stream, but also provides important substrate for trout and other aquatic life.

NCD methodology is so successful because by restoring the channel's shape and profile to stable dimensions, stream function is maximized for the given site constraints. The restored stream channel can now withstand floods by redirecting the current flow away from its banks into the center of the stream channel. The reconfigured streamflow allows for the dissipation of floodwaters and the transport of sediment. This holistic watershed rehabilitation ultimately creates and maintains better trout habitat.

To see a video about this habitat restoration project, log on to the LSSA website - www.steelheaders.org/projects.html.

PROJECT PARTNERS

Funding –

Lessard-Sams Outdoor Heritage Council Grant

Conservation organization –

Lake Superior Steelhead Association

Engineering –

Cardno Inc.

Construction –

Environmental Troubleshooters Inc.

Photo and video production –

Seaquest Productions

Assessment –

University of Minnesota Duluth
National Resources Research Institute

Regulatory –

DNR, Lake County and
Army Corp of Engineers

TO LEARN MORE...

WWW.ENVIRONMENTALTROUBLESHOOTERS.COM • (218) 722-6013



Assisting Clients with Responsible Development

- *Brownfields Redevelopment*
- *Phase I / Phase II Assessment*
- *Pre-Demolition Inspection*
- *Environmental Permitting*
- *Asbestos and Lead Paint Inspections*

Environmental Troubleshooters, Inc.

3825 Grand Avenue
Duluth, MN 55807 218.722.6013
www.environmentaltroubleshooters.com