Nebagamon Creek facing west.
Photos courtesy Paul Piszczek

Mission Accomplished, Nebagamon Creek

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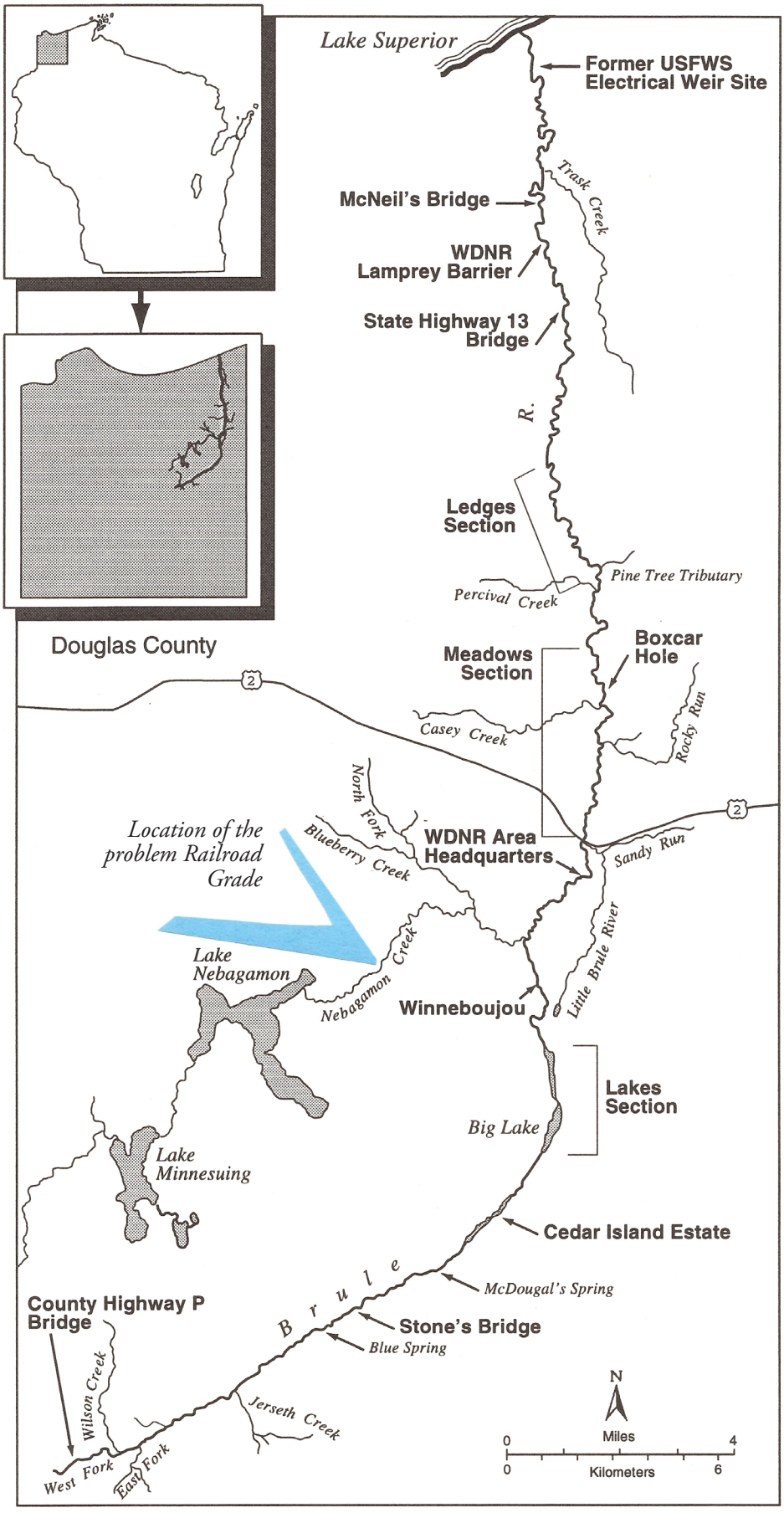
Mission Accomplished, the South Shore Rail Grade on Nebagamon Creek is gone.

In 1934, a defunct railroad company left its grade on Nebagamon Creek, the Bois Brule River's largest tributary. Eighty-nine years later, in 2023, the grade was removed after governments and non-governmental organizations partnered to achieve the goals of eliminating the grade's sedimentation threat to Wisconsin's Bois Brule River and improving fish passage throughout the watershed.

Introduction: In 1892, the Duluth South Shore & Atlantic Railway Company constructed a line from Iron River, Wisconsin to the East end of Superior, Wisconsin. After only 42 years of service, the line was abandoned in 1934 when the company removed the tracks and appurtenances. The company removed the wooden bridge over the Bois Brule River but left the concrete culvert and the grade on Nebagamon Creek. It remained forgotten until the initial downstream wing wall began partially collapsing in 1992. The Township of Brule secured the help of the Wisconsin National Guard to remove the concrete fragments that year.

In 2010, a downstream resident, notified DNR Fisheries that both downstream wing walls had entirely collapsed. which partially blocked the outflow of the culvert and reduced the culvert's discharge capacity by at least half. This consequently backed up Nebagamon Creek for a considerable distance upstream. Further, the collapsed concrete was no longer preset to support the rail grade's soils, which resulted in the downstream face of the nearly 40-foot-high grade to gradually erode into the creek (Photo 1). This issue was swiftly reported to DNR's Water Regulatory permitting staff, who began working to identify a responsible party or landowner. This was the first step toward resolving the growing sedimentation concerns, particularly



Map courtesy Dennis Pratt.

as the grade increasingly eroded. Any permit application to remove the culvert and grade had to be signed by a responsible party or property owner. Since this was an abandoned rail grade of a now defunct railroad company, identifying the present-day owner was a task that extended beyond DNR's typical regulatory purview, and as such evolved into a yearslong effort.

In 2014, the Brule River Sportsmen's Club expressed to DNR Fisheries the concerns regarding the grade's condition and implications for downstream sedimentation. A May 2015 site visit by this article's authors and other DNR Fisheries staff revealed the grade's ongoing deterioration and need for action. In addition to revisiting the status of landowner identification, the site visit prompted a concern that the concrete fragments could be a barrier to fish passage, which was a progressive topic of interest for resource managers regionally and nationally.

Photo 1: Railroad grade facing up stream.

Scope of the Threat

In addition to the grade's vast soils was the substantial volume of water that could be stored by the grade if the failing culvert became completely obstructed. This volume of water, if released by the grade's complete collapse, would surge through Nebagamon Creek and into the Bois Brule River approximately four miles

downstream. The surge's force would likely scour many thousands of additional cubic yards of sand from the banks of Nebagamon Creek and its valley walls.

A potential scenario follows, where some elements occurred during floods in 2011 and 2018 that destroyed road crossings on other Wisconsin south shore Lake Superior tributaries:

- South Shore Grade culvert collapses or becomes completely plugged with debris.
- Nebagamon Creek rapidly pools behind the grade while draining approximately 34 square miles of upstream watershed at an average flow rate of nearly 16 cubic feet of water per second.
- The grade acts like a dam and either collapses or is overtopped.
- The extent of the downstream impact, including the Bois Brule River, depends on the volume of water impounded upstream and how quickly the impounded water washes away the grade.
- The grade's failure creates Nebagamon Creek valley's largest flood.
- The flood surge enlarges Nebagamon Creek's channel by scouring the sandy stream banks and valley walls, potentially to the confluence with the Bois Brule River nearly four miles downstream.
- Valley walls exposed by the surge continue to erode and deposit additional sand until naturally stabilized by vegetation many years later.
- The Afterhours Road crossing fails and requires reconstruction.
- The grade's sandy soils are continuously deposited and re-deposited throughout Nebagamon Creek and the Bois Brule River, reduces trout and salmon spawning habitat and abundance, fills rearing and refuge habitats such as pools, and creates overall instability in the trout and salmon populations for years to come.
- The altered stream fish production depresses the Lake Superior nearshore fishery and its economic activity, due to the Bois Brule River Watershed's large contribution to that fishery.

Planning

The railroad grade's immense size (nearly 40 feet high, 110 feet wide, and 600 feet long), its bulky 12-foot-wide, 110-foot-long concrete culvert, and its long-standing presence on exclusively private land were symbolic of the magnitude of effort needed to plan their removal. The multi-year span's early days in 2015 and 2016 were filled with file and deed research to identify the rail grade's actual owner(s), as work could not begin on the land without written consent from the landowner(s). The research stretched from state to county to federal offices, in this case communications with National Archives in Washington, DC, as well as the University of Wisconsin's microfiche collection. Though deeds suggested ownership by the railroad, the complexities of railroad lands law confounded any accurate determination of the actual landowner.

The most practical way forward was for DNR Fisheries to receive consent from all potential landowners before working on the land. And so began the development of easements by DNR for each individual landowner, two of which were out-of-state. These required frequent correspondence and numerous drafts of easements that were eventually agreed-to and signed, all of which had specific negotiated terms and conditions and some of which were incorporated into the project's design. Further, DNR Fisheries worked closely with the Town of Brule, as the project would utilize Bellwood Pit Road as

Railroad grade facing west.

Railroad grade facing up stream.

the haul road between the rail grade site and the disposal site, which was a gravel pit owned by Douglas County approximately two miles away. As part of the project, the Town expressed interest in using soils from the rail grade to raise portions of Bellwood Pit Road, mainly to minimize the frequency of water on the road during rain events.

During the latter stage of landowner research, individuals from various organizations such as Brule River Preservation, Inc., Brule River Sportsmen's Club, and Izaak Walton League came together as an ad hoc group who began regular meetings with DNR Fisheries to share ideas for the project's oversight, development, and funding. Among its contributions, the group notably gathered funds through its respective organization's members and reached out to other organizations, eventually expanding to other individuals that administered a GoFundMe campaign. The group concurred that DNR Fisheries should oversee the project's development and implementation, and any funds raised through private donations would be banked in DNR's gift account for the project.

The design and permitting phase followed the signed easements, and consultation with the Town of Brule continued regarding Bellwood Pit Road. As the design was scoped, the need for a floodplain study for the rail grade site became evident based on the anticipated changes to flood patterns after removing the rail grade and culvert. This was a county requirement, administered through the state, with direct connection to the Federal Emergency Management Agency's authority over floodplain management. When completed, the floodplain study became

a part of the approved DNR Waterway Permit. Other permit requirements included consistency with the state's Natural Heritage Inventory regarding state and federal threatened and endangered species and implementation of approved DNR Stormwater Program permits. DNR Fisheries served as the project's responsible party and therefore signed all permit applications, except for the Bellwood Pit Road permit application. Similar permits and a floodplain study were also required for the Bellwood Pit Road portion of the project, as the increased road elevation would inherently create a backwater effect against the road. Any backwater would need to be drained through new, appropriately sized culverts that would replace the existing culverts. This played into the project's overall cost and design.

Another component of the project's planning process was the procurement of funds beyond those raised by sport clubs, conservation organizations, and the public. DNR Fisheries and the ad hoc group recognized the need for additional funding as the project evolved. In addition to DNR Trout Stamp, funds were requested from two federal sources through grant applications, one of which was submitted to the U.S. Fish and Wildlife Service National Fish Passage Program. The other application was for a National Oceanic and Atmospheric Administration Great Lakes Fish Habitat Restoration Partnership grant, which DNR learned of through its conversations with the Great Lakes Fishery Commission regarding Lake Superior-related projects. DNR Fisheries used many elements from the fish passage grant application to develop the content for the fish habitat restoration partnership grant application, which was subsequently submitted by the Commission. With the awarded grants came administrative requirements, such as progress reports, and specific to the Great Lakes Fish Habitat Restoration Partnership Grant, data management and quality assurance documentation. These were prepared and submitted by DNR. In the end, nearly $1,000,000 was raised for the project, which consisted of $56,301 of privately raised funds, $65,000 of fish passage grant funds, $278,557 of DNR Trout Stamp funds, and $620,000 fish habitat restoration partnership grant funds.

Railroad grade facing west.

Railroad grade facing up stream.

Construction/Cost

The Project was completed on October 13, 2023, after construction began on August 16, 2023. This consisted of removing nearly 30,000 cubic yards of fill material (generally sand and clay), which was done with excavators, off-road dump trucks, and bulldozers. Construction

also consisted of clearing trees, transporting the material to a local gravel pit, removing the extant concrete culvert and wing walls, installing in-channel grade controls such as cobble/boulder riffles, and installing large wood within the new stream channel margins. Many of the trees, cobbles, and boulders cleared and excavated from the site during construction were re-used in the new stream channel as fish habitat and channel geomorphological features where appropriate (Photo 2). Most of the rail grade and culvert's removal occurred over six weeks, though within that time, nearly seven construction days were lost when area rainfall saturated the soils and prohibited effective operation of the heavy equipment.

Wren Works, LLC (Poplar, WI) was the construction contractor and Beaver River Consulting (Duluth, MN) was the design engineer, which also provided construction oversight during new stream channel and floodplain construction. The Town of Brule and Olson Bros. Contractors provided final grading on Bellwood Pit Road. DNR Fisheries frequently visited the site and provided guidance throughout the construction period. The project's total cost was approximately $850,000.

Final Product/Outcome

The project's final product is Nebagamon Creek's daylighted and free-flowing condition (Photo3). Its channel and valley dimensions closely match those of the upstream and downstream segments, and whose channel and valley are no longer susceptible to any risk associated with the rail grade's potential collapse. The project's timeframe extended nearly five years beyond the anticipated 2018 start year, which was heavily influenced by the unanticipated time needed to plan the Project (i.e., land use agreements, permits, floodplain studies, etc.), the procurement of sufficient funds, and the altered work schedules and productivity prompted by the COVID-19 pandemic in 2020.

Closing Statement: Our combined public and private efforts over the last eight years removed the grade's soils and culvert before they had a chance to impact Nebagamon Creek more heavily and the Bois Brule River. Many thanks to all the government agencies, individuals, businesses, and organizations who donated funds to proactively manage habitat in the Bois Brule River Watershed. ■

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